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ADDRESS.

CHAIRMAN'S ADDRESS.

Read in the Section on Ophthalmology at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5–8, 1894.

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One of the great faults of our medical societies is the occupation of the time in reading papers and participating in discussions which, for the most part, are the mere quoting of authorities and presenting of views that are not new.

The chairman is, however, a privileged individual in this respect, as he is either expected to present a *résumé* of the present status of our science, or make a few general platitudes that may serve to open the meeting of the Section, and if possible put us in good humor with ourselves and our profession. It would be fortunate if all of our old straw could be threshed out in this one address, so that the remainder of our time could be profitably spent in the presentation of original observations and participating in discussions that might prove of permanent value to each of us. And yet an occasional review of what has been done by our predecessors often proves of inestimable value, and nothing like an extensive acquaintance with the literature of the subject so effectually prevents the presentation of poorly prepared and incomplete observations as "new truths." I have had occasion to remark that it is much easier for me to prepare a paper on some other subject than those pertaining to the eye, and I suspect the reason is because I know less about what has been done in other directions. Because the thing is new to me I am tempted to present it as new to others.

A few years since when the treatment of granulated lids by "grattage" was proposed, I was reminded of the treatment recommended by St. Yves[1] for a similar condition nearly two hundred years ago. He says: "It is to be noticed that the *Spots*, the *Ulcers*, and certain *Abscesses* of the Cornea Transparent, attended with an Inflammation of the Conjunctiva are more speedily cured by Bleeding of the *Eye*, than by any other Means. Notwithstanding in some cases it is not proper as Practice evinces. This Bleeding of the *Eye* is performed in different Manners. Some take a Bundle of Beards of *Oat-blades* and make a kind of Brush with which they scrape the Conjunctiva and so scarify it: [Grattage]. Others pass a covered lancet between the Globe and the Eye-lid and scarify the Cornea [Sclerotic] with it. Others glide a *Crooked Needle* under the varicous Vessells which communicate with the *Spot*, *Ulcer* or *Abscess* and cut the Vessels which creep on the *Conjunctiva*. This last operation is the surest and least painful." Have we anything better to propose to-day?

Since Richard Banister, Master of Surgery, Oculist and Practitioner of Physic, published his little book of twenty-three pages on the preservation of the "Eye-sight" three hundred years ago, in which our illustrious predecessor gave the *regime* he thought necessary to preserve the sight, together with the chief lotions, syrups and juices that should be applied to eye diseases, we have made wonderful progress; and yet we must confess there are many points needing elucidation, that will require the most patient study on the part of the anatomist, histologist, physiologist, pathologist and clinical observer.

Who will give us a clear and rational description of the course and termination of the intra-cerebral fibers of the optic nerve? Who will explain to us the cause of sympathetic ophthalmia? What are the relative functions of the rods and cones? Who will give us a good working theory of color perception? one that will explain color blindness. Why is it that after the canaliculus is slit and large probes passed that the tears continue to overflow? What operation for cataract extraction is the best? The last word has not been said on heterophoria and errors of refraction, as we shall doubtless learn before the close of this meeting. These and numerous other important problems require our most careful consideration. In order to solve these questions we can not be guided entirely by our own experience. Many of them can not be answered by one generation, and need not only the experience of ophthalmologists of the present, as well as the past, but that of the entire profession, including the labors of chemists, physiologists, physicists and men engaged in every department of scientific research. It will be a most unfortunate step backward if we, as ophthalmologists should permit ourselves to be segregated from the great body of the medical profession as the oculists have been in ages past, or as the dentists are now.

One of the most interesting chapters in Richard Banister's book[2] is devoted to the exposure of what he calls "proud quack-salving mountebanks, that would undertake all cures, and perform few." He says further: "In the methodicall practice and cure of blind people, by couching of cataracts, our English oculists haue always had an especiall care, according to arts, to couch them within doores, out of the open aire, to preuent further danger. Yet some of these mountebanks take their patients into open markets, and there, for vain-glories sake, make them see, hurting the patient, only to make the people wonder at their rare skill. Some others make scaffolds, on purpose to execute their skill vpon, as the Frenchmen and the Irishmen did in the Strand, making a trumpet to be blowne before they went about their work."

Much of the prejudice (and with justice) against oculists who treated diseases of the eye exclusively, has been handed down almost to our own day. Only a few years ago a most bitter fight was made against

[1] A New Treatise of Diseases of the Eyes by M. De St. Yves, translated from the original French by J. Stockton, M.D., London, 1741.

[2] A treatise of 113 Diseases of the Eyes and Eye-lids, by Richard Banister, Mr. in Chyrurgery, Oculist and Practitioner in Physicke, published for the second time in 1622.

Dr. Nettleship's appointment on the staff of the Royal London (Moorfields) Ophthalmic Hospital. The only objection of any weight urged against his appointment was that he is not a general surgeon.

An interesting parallel between the separation of the oculists from the general profession of old, and the present tendency in that direction might be drawn. The tendency at present is to make expert opticians but poor oculists. We must be something more than spectacle pedlers. We must keep in touch with the general profession. In order to do this, we must not only have an extensive knowledge of general medicine and surgery, but we must insist upon better education of medical students in eye diseases.

Because the ophthalmologist fails to relieve a headache by the use of spectacles, or a tenotomy, he has not exhausted all the resources of his art. And even though he refer the case to the general practitioner he should be able to make intelligent suggestions as to the future management of the case. It is possible to have reflex troubles originating in the eye not due to refractive errors, muscular insufficiencies and possibly not manifested by gross pathologic changes in the eye itself. On the other hand it is possible to have pain referred to the eye as the result of some constitutional disease, or it may be of some local disease in a distant portion of the body.

The tendency to supply every town and village with one or more oculists so-called, who limit their practice to the treatment of eye diseases is not for the best interests of the patient or the profession. The helplessness of the average medical practitioner in a small town when some young gosling comes to the village with his six weeks' post-graduate instructions, brand-new trial case and ophthalmoscope is pitiful indeed. The practitioner is made to feel keenly his ignorance of the subject. He knows intuitively that he is being imposed upon by a few big sounding names, but is entirely helpless in preventing this fledgling from giving myopic lenses to hypermetropes and snipping the ocular muscles of all the bright school girls in the village.

As an example of the ingenuity of these fellows I have in my possession a pair of bifocal lenses which analyzes as follows: Right eye + .25 C. axis 90 for distance, ⊃+25 C.⊃+.50 S. for reading. Left eye + .25 S.⊃+.50 C. axis 75 for distance, and +1. S.⊃+ .50 C. axis 75 for reading. These lenses were given to an Oberlin student aged 18, who has a simple hyperopic astigmatism of .75 D. axis 90 in each eye.

Every practitioner should possess an ophthalmoscope and a few trial lenses, and he should be able to fit spectacles much better than the jewelers and druggists who style themselves opticians, and I see no reason why he should make such ridiculous blunders as the above. That every practitioner who knows a little more about the care of eyes than his neighbor should pose as an ophthalmologist and limit his practice to eye diseases, is almost as preposterous as the claims of the jeweler optician. After an apprenticeship of ten, twenty or thirty years the ranks of the ophthalmologists should be recruited from these practitioners who have given the eye and its diseases special study.

There is a considerable amount of work which requires especial skill and experience on the part of the ophthalmologist in the diagnosis and treatment of eye diseases. It is not possible for a man to make a skilful cataract extraction who only has the opportunity to make the operation once or twice a year, nor is it possible to distinguish between a case of chronic glaucoma and atrophic cupping of the disk by one who sees such cases but once or twice in a lifetime. To make skilful operators and acute diagnosticians the specialist must have had a wide experience; and this can only be secured by a long apprenticeship, with exceptional opportunities for study and practical experience, in the performing of delicate manipulations and the making of difficult operations.

The specialist is the general practitioner's most valuable assistant. He supplies him with skilled hands to do that he can not do. He furnishes him with educated eyes to see that he can not see. He gives him trained ears to hear that he can not hear. And he should supply him with a well stored mind to tell him that he does not know.

When about to select an architect to build a house, if we found him ignorant and exhibiting poor judgment in matters pertaining to religion, science, literature, art and other subjects about which we knew something, we should distrust his judgment in architecture about which we know nothing. If this is true in a general way, how much more must the physician distrust the judgment of the specialist who is ignorant of general medicine and surgery.

The promptness with which the announcement of the reading of a paper on an ophthalmic subject will empty the seats in our local and State medical societies is discreditable alike to the practitioner and to the oculist; discreditable to the physician because he does not take greater interest in ophthalmic subjects as no other special study lends so much assistance in the diagnosis, prognosis and treatment of disease remotely situated. Discreditable to the ophthalmologist because he does not make his papers so interesting as to compel attention. In order to do this he must as far as possible discard technical terms. The necessity for this is largely due to the insufficient and perfunctory manner in which ophthalmology is usually taught in our medical colleges.

A gynecologist has a great advantage in teaching his specialty, because of the simplicity of the structures, and the previous studies of the medical student in anatomy, physiology, embryology and obstetrics have prepared him for an intelligent understanding of the teaching of the gynecologist. But when the average medical student enters upon his ophthalmologic studies it is a veritable *terra incognito;* he has little knowledge of the anatomy of the eye and its appendages and less of its physiology.

The nomenclature is all new, and because the subject seems difficult it is neglected. The lectures are cut, quizzes avoided, dispensaries not utilized and the practitioner is turned out with but little knowledge of the subject.

One of the principal reasons for this unsatisfactory conditions of affairs is that there is not enough time allotted to this subject in the medical curriculum. In some schools I am informed the study of ophthalmology is not compulsory. The teacher realizing the hopelessness of instilling any useful knowledge into the mind of the student in the few hours given him, is often content to call attention to the most frequent and grave ocular diseases, make a few operations and advise the student meeting such cases not to attempt their treatment but to send them to the nearest oculist.

It does not seem to me that we ought to be content to let this indifferent method of teaching this important subject continue. The use of the ophthalmoscope is not more difficult to learn than that of the stethoscope, and of much more value to the practitioner of medicine. The teachers of ophthalmic medicine and surgery ought to decide upon some definite minimum length of time in which the average senior medical student can master a good working knowledge of this subject, and then insist upon being granted this amount of time in the medical curriculum. This would require at least 100 hours; 50 of which should be devoted to didactic lectures, clinics and recitations, and 50 to practical work in the dispensary.

My experience as a teacher of ophthalmology has been that those students who leave college with some definite knowledge of eye diseases, not only treat more intelligently the cases coming under their care, but are the first to refer suitable cases to the specialist—so that the better education of the general practitioner in eye diseases does not curtail the number of cases referred to the oculist for treatment but increases the number of his consultations.

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ORIGINAL ARTICLES

THE PHYSIOLOGY OF CERTAIN OCULO-MOTOR PHENOMENA WITH RESPECT TO SOME RECENT THEORIES OF ASTHENOPIA.

Read in the Section on Ophthalmology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

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That physiology is the basis of scientific medicine is generally recognized. Medical students are taught that physiologic processes and the known laws governing them, form the foundation of our knowledge of the pathologic conditions with which we have to deal,—a criterion of the value of clinical observation; the base-line from which we are to estimate every real or apparent deviation from the normal functions of the human body. More especially is this true as regards ophthalmology, in many respects the most scientific department of medicine. Nevertheless, there have appeared in our ophthalmic literature, during the past five years, a number of theories which, when critically analyzed have little or no substantial scientific foundation.

While it is true that our knowledge of ocular physiology is incomplete, yet those physicians whose educational training has disciplined their minds to act logically; to habitually analyze the evidence presented; to refer phenomena if possible to known laws, have naturally assumed a conservative attitude toward the attractive theories and sanguine assumptions of certain authors, and it is in the ophthalmological sections of our societies and congresses that a minority of the members, possessing the courage of their convictions, have opposed them. The articles of these authors indicate that though they conduct their examinations with a degree of method as regards the use of ordinary tests and apparatus, they do not employ an equal degree of scientific method in marshalling their facts or make correct inferences from the knowledge so acquired—in fact, they do not reason scientifically. To do so as regards the phenomena of binocular vision requires, as we know, a considerable knowledge of physics and mathematics, as well as the ability to apply it; above all it requires an intimate knowledge of ocular physiology. Instead of referring their observed facts to some known natural law, or seeking an unknown law on which to ground them, some of our authors hasten to propound an hypothesis to which an inadequate number of observed facts are made to conform, thus pursuing a *deductive* rather than an *inductive* method of reasoning.

Nevertheless, while without theoretical proof and practically more or less mischievous, some of these novel and attractive hypotheses and the therapeutics based upon them have attained, to judge from some current ophthalmic literature a wide popularity, and govern the practical work of many of our colleagues. They who have the best interests of American ophthalmology at heart should not therefore take refuge in indifferent silence.

There is, as we know, a considerable difference of opinion among ophthalmologists of to-day concerning the significance of the phenomena attendant upon the function of binocular vision, which comprehends the two associated functions of the focal and axial adjustment of the eye. Especially is there a difference of opinion as to the relative influence to be attributed to each of these functions as a cause of asthenopia.

During the past five years particular attention has been directed to the oculo-motor apparatus, largely owing to the refinement of the clinical apparatus employed for the detection of errors of muscular equilibrium, and to their classification under the various forms of heterophoria.

In the discussion of papers bearing on this subject, it appears to me that those participating have too little common ground on which to meet. As an illustration of this, I may mention the remark of Dr. Stevens in a recent paper, that the half written cases with bare statements of the results of certain tests "leave in the mind of the critical reader the impression that the writer has not himself ascertained the remaining facts necessary to a just conclusion." How rarely, for instance, do we find in the report of an asthenopic case any record of the ranges of accommodation and convergence, or more important still, a record of the relative ranges of these two functions, physiologically so closely connected with normal adjustment of the eyes.

While it is not my purpose to attempt an elaborate discussion of theories, I shall endeavor to analyze certain hypotheses concerning the origin of asthenopia, so as to demonstrate wherein they are or are not tenable as correct or incorrect doctrines, according to the established principles of physiology and the facts of clinical experience.

Let us consider first the theory of "insufficiency of the oblique muscles," the discovery of which its author states he announced in 1891 as an explanation of certain cases of eye-strain. Briefly stated, the phenomenon[1] is as follows: A horizontal line being regarded at eighteen inches and seen double by one eye before which a Maddox prism is held, a third line is seen between the two parallel ones and according to the author, "with which it should be perfectly parallel." In "insufficiency," the right end of the middle line pointing toward the bottom and the left end

toward the top line, or *vice versa* depending on the nature of the individual case. As is well known, upon this phenomenon, dignified by the term cyclophoria, the theory has been erected which is held to be explanatory of a form of asthenopia, and this is supposed to be corroborated by the relief claimed to result from the gymnastic exercise of the oblique muscles by cylindrical lenses. That this phenomenon is a physiologic one and that the eyes normally rotate outward on the axis of fixation in convergence, any one can easily verify by a few simple experiments, with or without prisms. One of the simplest is a modification by Le Conte of Meissner's original experiment for the determination of the horopter: "Hold a stretched black thread parallel with the surface of the glass of an open window, and within half an inch of it. Now, with the eyes in the primary position look, not at the thread, but at some spot on the glass. It will be seen that the double images of the thread are not parallel, but make a small angle with each other, thus—∨."[2] I have found a simpler experiment can be made by taking a piece of black thread about eight inches long, tying a knot midway between the ends, moistening it and then sticking it in a horizontal position on a pane of glass at the level of the eyes. Then converging the eyes upon the knot and approaching it gradually, at a distance of from four to six inches the thread will appear double toward the ends, the knot and the thread for about one-quarter of an inch on each side of it appearing

Fig. 1.

single and the divergence of the ends increasing with the convergence. The divergence is increased by inclining the head so as to converge upwards, since in the great majority of cases the inclination of the images is that resulting from an outward rotation of the eyes on the line of fixation; this rotation is decreased by looking downward, and as Le Conte and Meissner have shown, the vertical meridians of the eyes are parallel and vertical when the plane of vision is depressed 45 degrees, so that the inclination of the middle line as seen by a Maddox double prism disappears at that inclination. In some cases the rotation is in the contrary direction and all the conditions reversed.

That this phenomenon in no way disturbs binocular vision, is owing to the habitual neglect or toleration of the necessarily incoincident positions of images outside the immediate area of fixation. Meissner, who arrived at his results indirectly while investigating the question of the horopter, attributed the phenomenon to an outward rotation of the eyes on the visual axis. By far the most refined method of proving and measuring this rotation in convergence is that described by Prof. Le Conte (*loq. cit.*, p. 180): "Prepare a plane two feet long and one foot wide. Dividing this by a middle line into two equal squares, let one of the halves be painted black and the other white. Let the whole be covered with rectangular coördinates, vertical and horizontal; on the black half the lines being white and on the white half black. Near the middle of the two square halves, and at the crossing of a vertical and horizontal line, make two small circles, c c'. Set up this plane on the table in a perfectly vertical position, and at a distance of two or three feet. Rest the chin on the table immediately in front of the plane, with a book or other support under the chin, so that the root of the nose shall be exactly the same height as the circles, which in this case is about six inches. Now shutting alternately one eye and the other, bring the image of the lowest part of the root of the nose coincident with the horizontal line running through the circles. The primary plane is now perfectly horizontal, and therefore at right angles to the experimental plane. Now, finally, converge the eyes until the right eye looks directly at the left circle, and the left eye at the right circle, and of course the two circles combine. If one is practiced in such experiments and observes closely, he will see that the vertical lines of the two squares (which can be readily distinguished, because those of one are white and of the other black), as they approach and pass over one another successively, are not perfectly parallel, but make a small angle, thus—$^{r}\vee^{l}$; and also that the angle increases as the convergence is pushed farther and farther, so that lines even beyond the circles are brought successively together. Similarly also the

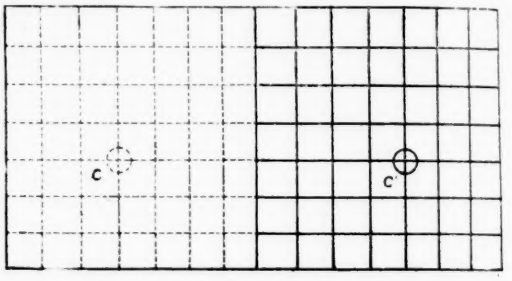

Fig. 2.—In this drawing the left half is drawn with red lines on a white background, because of the difficulty of drawing white on black background, as it should be.

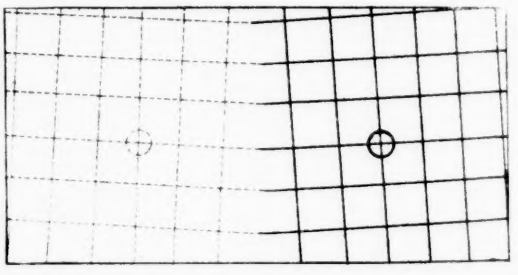

Fig. 3.—Left half should be white lines on black background.

horizontals cut each other at a small angle, but this is not so easy to observe as in the case of the verticals.

"*Experiment 3.*—A far more accurate mode of measuring the amount of rotation is by constructing diagrams on a plane similar to the one used in Experiment 1, but in which the verticals and horizontals are both inclined on the true verticals and true horizontals in a direction contrary to the rotation of the eyes, *i. e.*, inward—and then determining the degree of convergence necessary to make them come together perfectly parallel. I find that for my eyes, when the verticals are thus inclined in each square one and one fourth degrees with the true vertical, and therefore make an angle of two and one-half degrees with each other, they come together parallel when the point of sight is seven inches from the root of the nose. When the angle of inclination in each is two and one-half degrees with the true vertical, and therefore 5 degrees with each other, the point of sight must be four inches off. When the inclination with

he true vertical is 5 degrees, and therefore 10 degrees ith each other, the point of sight is two and one-fth inches. Finally, when the inclination with the ue vertical is 10 degrees, or 20 degrees with each ther, then they can be brought together parallel nly by the extremest convergence, the point of sight eing then only a quarter of an inch in front of the oot of the nose. In the diagram, Fig. 3, the lines, oth vertical and horizontal, are inclined inward one nd one-fourth degrees, and therefore the verticals of he two squares make an angle with each other of wo and one-half degrees. It is therefore a reduced *ac simile* of the plane used. The coördinate lines oincide when the point of sight is seven inches from he root of the nose."

The evidence of Hering regarding the physiologic otation in question is also unmistakable: "In gen-eral," he says,[3] "the vertical meridians of the globe ndergo, in symmetrical positions of convergence of he visual lines, a rotation in the course of the infe-ior oblique, so that their upper ends diverge more when the visual plane is elevated and converge less when it is lowered than is the case with parallel visual lines and similar positions of the visual plane."

Finally, Landois[4] states under the head of "tertiary position," which he defines as "the position brought about by the movements of the eye, in which the lines of vision are convergent, and are at the same time inclined upwards or downwards; . . . the eye-ball is always rotated at the same time round to the line of vision and round its axis."

It will be noticed that Le Conte alone demonstrates a convergence rotation in the horizontal position of the primary visual plane.

Thus by the independent investigations of three careful and scientific observers, the outward rotation of the eyes in convergence has been for twenty years established as purely physiologic, yet as evoked by prisms it has not only been employed by Dr. Savage as the proof of a pathologic condition, but upon it he has actually based a therapeutic method, the value of which he has failed to substantiate by any adequate clinical evidence. I have satisfied myself by careful and repeated experiments, that this outward rotation begins in some perfectly healthy eyes, free from all asthenopia, at a distance of twenty inches, when slight vertical diplopia is produced by a prism, and that an elevation of the visual plane of 20 degrees will render it appreciable when the line observed is twenty-two inches distant. The action of the oblique muscles is invoked in support of still another theory of this author, namely, that of

"*The Harmonious Symmetrical Action of the Oblique Muscles in all Cases of Oblique Astigmatism.*" Briefly stated, this theory is based upon the assumption that the cylindrical deflection of the retinal image produced by corneal astigmatism necessarily produces a disturbing diplopia, unless this is neutralized by a compensatory rotation by the oblique muscles.

In an article published on "Binocular Metamorphosia," five years ago,[5] Dr. J. A. Lippincott, of Pittsburg, gave a clear analysis illustrative of the action of cylindrical lens with axes oblique in deflecting the retinal image, which applies to corneal astigmatism,

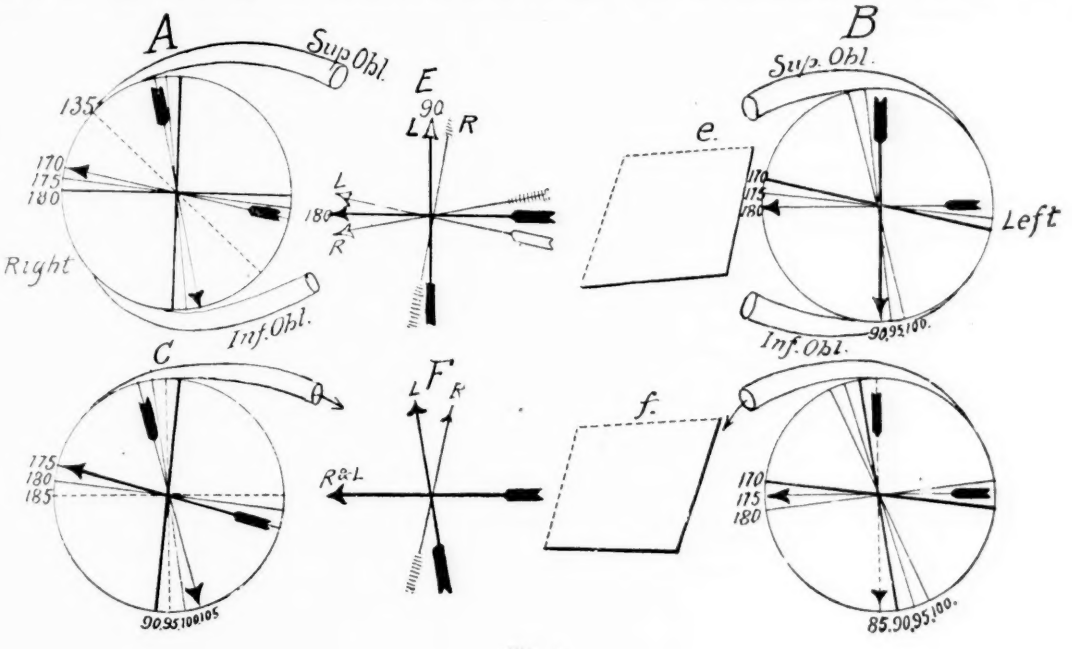

Fig. 4.

in all cases of which the corneal surface is represented by a convex cylinder with its axis at the meridian of lowest refraction. Since each half of such a lens may be regarded as a prism with its base at the axis, the deflection of incident rays and the position of the resultant retinal image may be readily determined, as Dr. Lippincott has shown. Moreover the amount of deflection rapidly decreases in proportion as the lens is approached to the eye. Thus I have found that a —2.00 cylinder held before one eye at a distance of thirteen inches, deflects the horizontal line of an astigmatic test chart 6 degrees by measurement, while held close to the eye the deflection is but three-fourths of a degree. The deflection produced by the same amount of cyclindrical effect at the corneal surface must be still less.

The drawings in Dr. Savage's article, (*Ophthalmic Record*, Vol. i, p. 1) illustrating the compensatory action of the oblique muscles, give with his description a plausible weight to his theory, but when closely analyzed it will be found that the supposed rotation, which would bring the retinal images of a

horizontal arrow upon corresponding portions of the retina, will at the same time not only fail to accomplish the same as regards a *vertical* arrow, *but the images of the latter will be made to harmonize still less than before the rotation.* In other words if a square card or astigmatic fan be viewed through a convex cylinder of 3 D. held about six inches from the right eye with its axis at 45 degrees, the other eye being closed, the right side or vertical line will be inclined 9 degrees to the right, and the lower side or horizontal line 9 degrees down to the left. (See Fig. 4, E and e). Now if the card or fan be rotated outward (which has the same effect as an inward rotation of the eye and lens) the horizontal line (side) will rotate to the right more rapidly than the vertical and will be horizontal; that is, its retinal image will be fused with the image of the same line as viewed by the left eye (Fig. 4, C and D). But the same rotation inclines the vertical line (side) still more from the true vertical, and its retinal image will be less parallel than before to that of the left eye. (Fig. 4, C and D). If each eye views a separate fan and each fan be rotated outward 5 degrees, the horizontal retinal images will coincide, while the vertical ones will be separated more at their tops by 10 degrees than before the rotation (see Fig. 4, F and f). Hence each rotation would defeat the very object for which it is invoked. But even if optical laws would permit of the correction claimed, it would not be necessary, for, as I have shown above, the maximum obliquity of the axis of the corneal cylindrical surface (45 degrees) produces a very slight deflection, *and incoincident images lying outside the immediate area of fixation are habitually neglected.* Indeed, upon the latter fact is dependent stereoscopic vision, since our conception of solidity results from the relief given to that portion of an object or scene binocularly fused in one plane, all other objects in front or behind that plane falling on non-corresponding points of the retina and producing double images which are neglected. This is very lucidly illustrated by Prof. Le Conte.[6]

As he states: "If we view in a stereoscope the fused image of the projection of a skeleton truncated cone as seen from two positions (Fig. 5, A and B) and are able to analyze our visual impressions, when the summit is fixed (Fig. 5, C) the base or larger circle is double, and *vice versa*, (Fig. 5, D) and still further that the lines a a′ and b b′ form a V or an inverted V or an X, according to the distance of the point of sight, which, by more or less convergence, is run back and forth, uniting different parts, and thus we acquire a distinct perception of depth of space."

In an article published two years ago by Dr. Harry Friedenwald on "Binocular Metamorphosia,"[7] he demonstrated that if two parallelograms similar in shape to those seen by a pair of eyes with a+2D cylinder, axes symmetrically oblique (45 degrees temp.) when regarding a square card are placed in a stereoscope, "they are fused so as to give the impression of a trapezoid, narrow at the top, and which is apparently leaning forward so that the top seems to be much nearer than the base. . . The appearance of depth points conclusively to the fusion of dissimilar images." That is, to such a fusion as illustrated by Prof. Le Conte's truncated skeleton cone. Dr. Friedenwald remarks that the above cited theories of Dr. Savage are "false in theory and dangerous in practice," and Dr. Lippincott states[8] that for the production of binocular metamorphosia "the existence of an astigmatic defect is not a *sine qua non*, although the phenomena are especially noticeable in cases of astigmatism of one or both eyes, in which the chief meridians are oblique." In such cases, he states further, "there ought to be an apparent inclination of one or both sides, as the case may be, of a square (so) that objects, therefore, and their retinal images do not correspond in form. Experience, however, derived especially through the sense of touch enables the mind to correct the erroneous information furnished by the sense of sight. *In other words, inaccurate retinal images are translated into more or less accurate mental impressions.*"—(Italics my own.)

As regards these theories then I conclude:

1. The phenomena included under the term, "cyclophoria," are physiological, being the result of the normal rotation of the eyes in convergence.

2. The phenomena in no way disturb binocular vision, owing to the habitual neglect or toleration of the incoincident positions of images outside the immediate area of fixation.

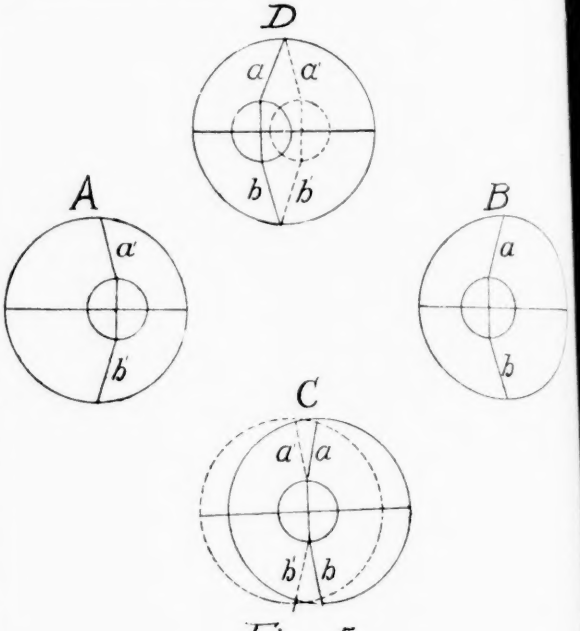

Fig 5.

3. A compensatory rotation of the eyes in cases of oblique astigmatism does not take place; if it did, it would defeat the very object for which it is invoked by the author of the theory.

4. If optical laws would permit of the alleged correction, it would not be necessary or expedient, since it would render stereoscopic vision impossible.

Another theory to which I desire to call attention, is that termed by its author, Dr. Geo. M. Gould, "Innervational Abnormalism the Cause of Heterophoria,"[9] and which he has more particularly elaborated in regard to the etiology and treatment of exophoria, stating: "I now wish to go so far as to state that my experience shows that every case of exophoria (and possibly of divergent strabismus) is certainly and quickly curable by a rational and common method of ocular gymnastics—*of a certain kind, however, mark well*, and absolutely without operation." He states further:[10] "It appears to me beyond question that in the vast majority of cases of exophoria, if not in all, the seat of the abnormality is purely, at

least primarily, and always principally, central and innervational. It is not at all a question of tendon insertions or of muscular strength." If therefore the seat of the difficulty lies in the innervational centers and coördinates, the treatment by tenotomy, or by gymnastic exercises (with weak prisms) seems to fall to the ground. We must instead seek to normalize innervation leaving the muscles and tendons entirely out of the count. In accordance with this, I have sought to break up the bad habit of exophorial innervation and reëstablish normality in an erroneous nervous coördination, to heighten convergence stimulus, and to carry this increased stimulus, as well as the naturally heightened stimulus of convergence at near range, into distant and all-around seeing." The method he suggests is that of "weighting," or handicapping convergence by adducting prisms at the near point, "then slowly carrying the object gazed at fixedly and continuously from the near to the distant point. This is repeated until the eyes with 20 degree prisms (total) can hold objects all about the room easily. "This repetition is to continue several times daily until this adduction power *is habitual*, and until no diplopia is produced on first adjusting the prism fronts and looking at distant objects immediately. When this condition has been reached, the strength of the handicap prisms is to be increased say, to 25 or 30 degrees and the method resumed as before. Before an adduction of 30 degrees (total) has been reached, the symptoms of asthenopia will long have vanished, but the manifest or latent exophoria will still usually, and to some degree, be present. The treatment from 30 to 40 degree prisms should be continued until all manifest and latent exophoria has disappeared, and 2 degrees of esophoria has become manifest."

"Deficient adducting power," he emphasizes, "is the source of trouble and the thing to cure."[11]

These views may be considered from two standpoints, viz:

1. In regard to the teachings of physiology.

2. In regard to the practical experiences of the ophthalmic surgeon.

1. The contention of Dr. Gould that the doubling or trebling by his method of the prism-adductive power at twenty feet, has nothing to do with "muscular strength or tendon insertions," is not in accordance with physiologic facts for:

a. The ocular muscles being striated muscular tissue are therefore subject to the laws of nutrition, metabolism, and the transformation of chemical into kinetic energy, in virtue of which, when made to vigorously contract, unlike other machines they are increased in strength and rendered capable of accomplishing more work.—(Du Bois-Reymond)

b. The mutual relations existing between the motor nerve-cells and the muscles, are not, however, inflexibles. Physiologists tell us that "stimuli act as liberating or discharging forces."[12] "These discharging forces may themselves be very feeble, but they are capable of causing the transformation of a large amount of energy."[13]

Foster remarks that it "might be imagined that a muscle which, when loaded with a given weight and stimulated by a current of a given intensity, had contracted to a certain extent, would only contract to half that extent when loaded with twice the weight and stimulated with the same stimulus. Such, however, is not necessarily the case; the height to which the weight is raised may be in the second instance as great or even greater than the first. That is to say, the resistance offered to the contraction actually augments the contraction; the tension of the muscular fiber increases the facility with which the explosive changes resulting in a contraction take place. And we have other evidence that anything which tends to stretch the muscular fibers; that any tension of the muscular fibers, whether during rest or during contraction, increase the metabolism of the muscle."[14] That this property of healthy muscle tissue must modify the conditions and results of its innervation and coördinations, can not be doubted.

c. A strong muscle (well nourished and exercised) responds more powerfully to a given stimulus (*i. e.*, sets free more energy) than a fatigued or unexercised one, and it requires a relatively feebler stimulus to accomplish a given amount of work with the former than with the latter.

d. "Of two muscles having the same cross section, the larger can do more work; whereas if two muscles are of equal length, that which contains the greatest number of parallel fibers will do more work than the other."[15]

e. Congenital variations, such as assymetry of the cranium, orbit and face (Stevens, Landolt[16]); exaggerated distance between the centers of rotation of the eyes (Mannhardt, DeRosset[16]); exaggerated divergence of the orbits (Emmert,[16] predispose the eyes to divergent strabismus, and much more to exophoria. "Abnormal conformation of the orbits," says Landolt, "giving rise to anomalies of origin or direction of the ocular muscles, may also cause a discordance in the direction of the eyes. Likewise defects of bulbar insertion and of the length and elasticity of these muscles upon which the most authoritative writers have strongly insisted. (Schweigger, von Hasner, Graefe and others.)"[16]

2. Let us now consider the innervational theory of the origin of heterophoria, and especially of simple exophoria *in the light of practical clinical ophthalmology*.

a. The auther maintains that "deficient adducting power is the source of trouble and the thing to cure," in exophoria, and which he considers wholly central and innervational.

b. I note first that the author's device of carrying the "weighted-convergence-stimulus" from the near to the far point is of value in rapidly developing the positive portion of the patient's *relative* range of convergence for distance, and as such it is, up to a certain limit purely innervational, since with a very high maximum of convergence (power of adduction) many individuals can not, without practice, co-ördinate even a medium convergence while relaxing their accommodation for distance. When the distant object is brought near to a patient wearing adduction prisms beyond his immediate power of fusion at twenty feet, the displacement of the images rapidly decreases; they are seen to approach each other and are easily fused. As the object is withdrawn the prismatic effect increases in proportion. Precisely the same adduction can be accomplished at twenty feet by a revolving or variable rotary prism, but not as quickly.

c. When the patient has acquired a power of adduction at twenty feet of 20 degrees (total,=three meter-angles) which is the emmetrope's average maximum relative convergence for distance,[17] the author's meth-

od *becomes one of ordinary muscular gymnastics* notwithstanding his emphatic contention that "'with muscular gymnastics' as such, my plan has nothing in common except the mere use of the prism—very strong prisms, however, instead of weak ones." The writer has made use of prisms up to 50 degrees (total) for convergence insufficiency for the past five years. It is to be noted that the auther has found that with an adductive power of 30 degrees (total) the manifest or latent exophoria is still present, but as the result of the gradual development of the interni by daily exercise with strong prisms, an adduction power of 30 to 40 degrees is attained "until all manifest and latent exophoria has disappeared and 2 degrees of esophoria becomes manifest." The pseudo-esophoria thus induced can fairly be attributed in young individuals to the habit formed of relative over-convergence and probably of over-accommodation, due to continued stimulation of both convergence and accommodation for distance.

d. The author argues that since "muscular tissue, as such, can not be made to double or treble its volume or its strength in a few hours or days, or even in a few weeks," while he can double the extreme adduction (twenty feet) of exophoric eyes in a minute or two by his device, that therefore such increase of adduction power is not muscular, but central and innervational. This is equivalent to stating that since a man who can lift 200 pounds and can not lift 400 or 600 pounds by main strength, but can balance a stick two yards long on his finger and in a minute or two can so balance one four yards or six yards long; that therefore the balancing is a matter of skill, that is, of innervational coördination, and not of muscular strength. For, a patient who at twenty feet has a maximum prism adduction of 10 degrees (5 degrees base on each eye) converges each visual line but 2.7 degrees which is the deviating angle of a prism of 5 degrees; the visual lines meeting at a distance of about twenty-six inches from the eyes. If by the author's device the adduction power for twenty feet is doubled so that 20 degrees (10 degrees prism on each eye) is overcome, the visual lines would intersect at the usual reading distance of thirteen inches or three meter-angles, representing still a very small quota of the average normal range of convergence, and requiring no unusual effort, nervous or muscular. The convergence is relatively great for distance, but small as measured by convergence after normal habit: in short, it is a feat of relative convergence. That such a degree of relative convergence may co-exist with deficient adductive power is often experienced. Thus, one of my patients who had abduction of 11 degrees and by rod orthophoria, but a maximum convergence of only seven meter-angles, obtained by Dr. Gould's method, esophoria 1 degree, abduction 7 degrees, but the maximum convergence remained at seven meter-angles. In this connection, the opinion of Schiötz is decidedly against the author's theory: "With insufficiency," he states, (*Arch. Ophth.* vol. xix, pp. 178-179), "we find no limitation of the movements of the eyes in lateral rotation, while a considerable defect of convergence may exist. If the lateral movements of the eyes demanded as much muscular energy as is demanded in the movements of convergence, we should be obliged to conclude that the defective convergence could not depend upon a weakness of the muscles, which perform the whole work in the associated movements; the insufficiency must, in this case, originate from anomalous innervation. Nevertheless, we are scarcely justified in identifying the muscular work produced by two different motions. We have found for normal eyes that the fusion near point lies about six centimeters from the rotation point of the eyes. The angle of convergence between the visual lines will then be about 60 degrees, therefore the rotation of each eye will amount to about 30 degrees. According to Alfred Graefe, the eyes in associated lateral motions can accomplish a version of from 42 to 45 degrees.

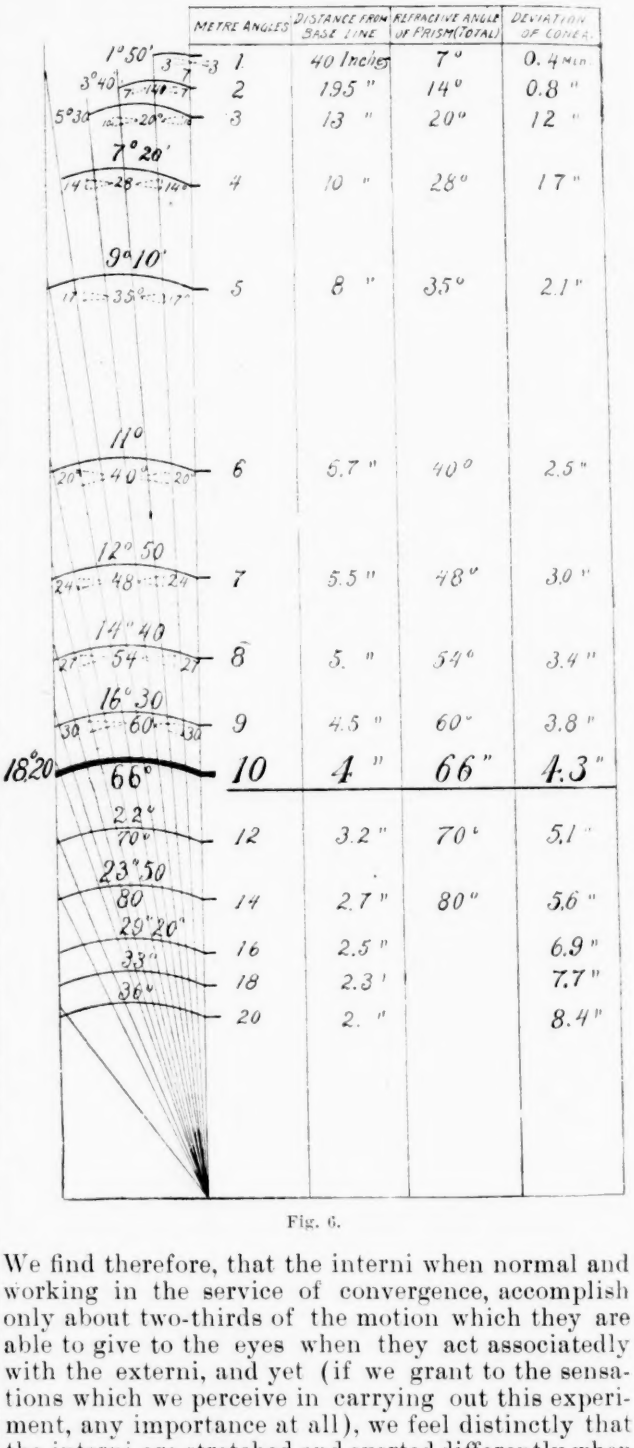

Fig. 6.

We find therefore, that the interni when normal and working in the service of convergence, accomplish only about two-thirds of the motion which they are able to give to the eyes when they act associatedly with the externi, and yet (if we grant to the sensations which we perceive in carrying out this experiment, any importance at all), we feel distinctly that the interni are stretched and exerted differently when we converge, than when we use them in associated lateral movements." I am sure that this greater

demand upon the interni in convergence is due to *contraction* of the externi, which are kept variably tense in convergence so that lateral movements may be made during convergence; indeed the eyes are rarely equally converged.

e. We may reasonably assume the average physiologic convergence (adduction) point should be as near as ten centimeters=(ten meter-angles = four inches) or a prism adduction power of 60 to 70 degrees (total) since Schiötz has found that what he terms the "fusion near point" should be no farther, this distance coinciding closely with what Landolt terms the average maximum of convergence; viz:[18] Nine and five-tenths meter-angles, and also with the point at which, according to Alfred Graefe, adduction and abduction are each 19 degrees 15 minutes and thus potentially equal.[19] (See Fig. 6.) Now it is of practical importance to know whether a patient has or not this amount of positive convergence at his disposal for if he has not, at thirteen inches he will have no reserve convergence. It can not be determined, either conveniently or promptly by prisms, since as stated above, the habitual relations of convergence and accommodation are thereby disassociated, and even the author's device will not, I have found, enable it to be determined. Thus in testing a patient recently I found adduction at twenty feet was 16 degrees (total)=twenty-two meter-angles. By the author's device this was quickly increased to 26 degrees (total)=three and seven-tenths meter-angles. The direct maximum convergence upon a pin-hole in a card was ten meter-angles, nearly three times his prism convergence in meter-angles. My own prism adduction at twenty feet is 96 degrees (total)=thirteen and seven-tenths meter-angles; with concave lenses to correct the over-accommodation and properly centered (—thirteen D centers fifty millimeters,) it is 114 degrees (total) = sixteen and two-tenths meter-angles; while by direct convergence (pin-hole) it is twenty-two and two-tenths meter-angles, equal to a prism convergence of 155 degrees (total). In another experiment I fused images of a candle flame continuously with adduction prisms of 72 degrees (total) at twenty feet. At thirty inches I could hold the images momentarily with 84 degrees (total), nearer I could not fuse them. An assistant now slowly withdrew the candle and at fifteen feet fusion was easy, up to twenty feet. On approaching the candle it at first remained single, but between fifteen feet and thirty inches the effort increased until at the latter point diplopia again occurred and the images were infusible. Hence it is clear that the device is of no assistance when very strong prisms are used, since the fusion is accomplished mainly by voluntary muscular strength. Dr. Gould appears to underrate the responsive contractile power resident in the interni themselves, as well as the voluntary power of strongly contracting the interni possessed by persons whose general muscular system is vigorous. I can, for instance, strongly converge my eyes in total darkness, for when I make the effort and the room is quickly lighted, an observer finds them in that condition.

f. But Dr. Gould's reported cases[20] also show that while the innervational features of convergence (which he does not increase but only renders available) can be quickly brought into play, the muscular feature is more slowly developed, as he remarks: "Before an adduction power of 30 degrees has been reached the symptoms of asthenopia will long have vanished, but the manifest or the latent exophoria will still usually, and to some degree be present." To me it seems that no decided muscular exercise begins until prisms 40 degrees (total) are used, necessitating a convergence of six meter-angles (= a point six inches distant) and 60 degrees or more may be necessary. In simple exophoria until such contraction of enfeebled interni is brought about, they are exercised little more than in reading, and until their static power reaches a certain limit through functional activity and consequent increased metabolism, any equilibrium test will show manifest or latent exophoria. The "rhythmic exercise" method of Dr. Savage appears to me the more physiologic treatment.

g. But while the development of the adductive power for distance has a certain value long ago conceded in the treatment of convergence insufficiency, that is of simple exophoria, a large percentage of cases showing a tendency to divergence are not exophorias in reality; says Dr. Stevens:[21] "Indeed, if we select indiscriminately a considerable number of cases of even simple exophoria, and an equal number of cases of even moderate hyperphoria, we shall find that the average converging power in the cases of exophoria, is considerably greater than in the other. . . . The ability to converge is often much more considerable in cases where there is actual divergence of the optic axes than in some cases in which there is positive convergence." Dr. Hiram Woods in a late paper on heterophoria remarks:[22] "I am skeptical about the adduction. In the first place, as has been pointed out by others, it is a *distance* test only so far as convergence can act independently of accommodation; *i.e.*, to the extent of the positive portion of the relative range of convergence for infinity. Dr. Randall says:[23] "Adduction can be made almost anything, if the patient and examiner have patience. It is striking how rapidly adduction increases as soon as the patient learns how to fuse images of unequal clearness. I have seen adduction of 48 degrees, while the balance test showed exophoria of 10 degrees." Practically, the experiences of the consulting room teach us that even after correction of all refraction errors, attention to the general health, to peripheral reflexes, etc., some anomalies, perhaps innervational, certainly at times abnormal tensions of the muscles of congenital origin, necessitate careful tenotomies or advancements, the results of which can only be successful when the operator's accuracy of diagnosis and technical surgical skill is approximately commensurate with the difficulties in the way of adjusting the mutual balances of twelve muscles. My own tenotomies and advancements have not disappointed me, and I have too often restored lateral equilibrium where actual exotrophia existed, to doubt the efficacy of *complete* tenotomy of the superior or inferior rectus in suitable cases. Ocular gymnastics especially with the stereoscope will do much to readjust inharmonious coördinations, but the fact remains coming from no uncertain authority, that: "We may give the muscles the gymnastic exercise which may be accomplished by the overcoming of prisms. That good may be accomplished in this way I have long ago demonstrated. The fact remains that the method is but tentative. The anomalous conditions remain and the unpleasant symptoms will probably return. A vast experience with these methods enables me, I be-

lieve, to speak of them with some degree of authority, and I do not hesitate to say that while no one can afford to overlook them, they fall far short of the more rational measures of actual adjustments by means of equalizing the tensions in such a way as to establish practical orthophoria."[24]

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DISCUSSION.

DR. EDW. JACKSON of Philadelphia—The reader of the paper has perhaps made the best use of the time of the Section in calling attention to current errors, which are frequently very misleading to those who are not especially interested in the particular subject. I quite agree with him that the rotary displacement of the image caused by oblique astigmatism is entirely insignificant, but the cylindrical lenses placed before the eye to correct such astigmatism will cause such rotation of amount sufficient to be of very practical importance for the images of all lines not parallel or perpendicular to the direction of the cylinder axis. This rotation is the cause of very serious inconvenience in the first wearing of cylindrical lenses, and this inconvenience may prevent the wearing of correcting cylinders by persons whose astigmatism has remained uncorrected until after 50 years of age. While in all cases it is the cause of inconvenience, in young persons the inconvenience always passes away in the course of two or three months at furthest. And this ability to accept the suddenly developed and much greater rotation of the cylindrical lens, argues very strongly against any continuance of inconvenience from the extremely insignificant rotation produced by corneal astigmatism.

DR. GEO. H. PRICE, Nashville, Tenn.—The paper proposes to put in a state of doubt the question of insufficiency of the obliques, and I will use his diagrams. The claim that this condition is normal, as produced by Prof. Le Conte would be sufficient evidence if he were investigating this peculiar question, but as he is not, then I must differ from his conclusions. It is essential for binocular single vision that the image must fall on corresponding portions of the retina, hence in the cyclophoria induced by oblique astigmatism, or insufficiency of the oblique muscles, you have this disturbed, and this disturbance must be compensated for by a rotation of the eye on its antero-posterior diameter. These diagrams which I hand you will illustrate these points. No. 1 shows the result of observing with each eye where there is no astigmatism, and you will observe that the figure is a rectangle; Fig. 2 shows the same rectangle when seen by astigmatic eyes, while Fig. 3 shows the resultant figure. These points can be demonstrated by the use of cylinders of 3 D. Dr. Price then gave an explanation of the diagrams.

DR. H. V. WURDEMANN, Milwaukee, Wis.—Abnormality is but a relative turn and should be used in a relative sense. For instance, astigmatism of 25 D. in one person may be considered abnormal, while 2.00 D. or more in another gives rise to no inconvenience and may be ignored. There are but few persons in whom it is *not* possible to demonstrate some form of heterophoria and this alleged cataphoria is probably a physiologic phenomena, despite the fact that theoretically, insufficiency of the oblique muscles is quite as probable as those of the recti. I will pass over this and turn to a subject of practical importance which was considered in the latter portion of Dr. Eaton's paper.

There is no doubt in my mind but that the method of treating exophoria proposed by Dr. Gould, is the best of our present known means for developing the strength of the internal recti. Unfortunately, Dr. Gould has referred the condition of exophoria to insufficient innervation. This is a factor, but those of improper insertion in the recti, increased pupillary distances, actual weakening of the muscular tissue can not be well ignored. In my hands, after a year's trial, I consider that this "gymnastic exercise" (for it is but that) not only increases the prism fusing power for distance, but in a less degree does so for near; it lessens or removes the exophoria for distance as well as the near, and actually increases the convergence for the near point, thus increasing the focal angle and all of this without establishing an over-action of the accommodation. For esophoria I have had less experience, but for the more common condition of exophoria I consider that the majority of cases may be cured by the Gould method, in connection with tonic treatment, more satisfactorily than by surgical or any other known means.

DR. SOUTHARD of San Francisco said, it is undisputed that it is indispensable for binocular image that there should be a clear and well defined image upon the fovea centralis, otherwise the result will be either diplopia or a diffused image. The passage of rays of light through an astigmatic cornea causes an irregular image upon the retina. If the astigmatism is oblique, the proof that rotation takes place in the endeavor to compensate this error lies in this, that between the far point and the near point the axis in astigmatics has been frequently known to change several degrees. A word as to Dr. Gould's treatment of heterophoria by prisms. He has to say that whether the theory be that of innervation or not, the practical results of such treatment have been found of inestimable value to the patient and physician. He is willing to grant that it may be only a gymnastic exercise of the occult muscles. It is claimed by some that its only good lies in the power to preserve binocular vision for distant objects. They claim that when we consider the dynamics of the eye, that it has not the same amount of effectiveness. On the contrary, many cases thus treated have given the best results for continuous work at the near point.

DR. KASPAR PISCHL, San Francisco—As it seems to me interesting to hear the experience of those who have tried Dr. Gould's method, I would like to state that I could relieve a number of patients from asthenopia caused by exophoria at the reading range by these gymnastic exercises. In most cases after a few minutes trial, with prisms, base out, I could find an increase in the adducting power of the recti interim. I hope that the members present will give us their experience on this point.

DR. H. BERT. ELLIS, Los Angeles—Dr. Southard is no doubt right when he says that inequality of the recti muscles may be found in nearly every individual; but we may also say that with every individual the amount of inequality varies from time to time. And if we acknowledge inequality in the recti, it seems to me we should not deny the same con-

dition in the oblique. A year ago I corrected astigmatism in a girl, axis 60 degrees and 120 degrees+0.50 D. Two months ago, clear vision could only be produced with the cylinders at 90 degrees, and it does not seem unreasonable to consider this the result of changes in the oblique muscles.

Dr. Eaton, in closing the discussion, said—In attacking the theories of Dr. Savage, I have in view the objectionable influence upon the therapeutic practice of those who accept his theories. I can not see that the arguments of Dr. Price disprove the demonstrated facts I have submitted. The attempt to asperse the evidence of LeConte and Hering as being the result of strictly scientific experiment unrelated to pathologic conditions, is not justified, since no more patient and thorough investigations could be made. Hering has anticipated every phenomenon of oculo-muscular action that has been mentioned to-day, especially as regards the transition from one secondary position to another. I must again assert that it is impossible to find a human being who has not, according to the tests of Dr. Savage, insufficiency of the oblique muscles, provided the person examined can analyze his visual impressions, which patience will enable him to do. Dr. Price remarked that when a cylinder is held before the eye with its axis vertical, there is no muscular disturbance and no distortion of the object. Yet any one regarding a square card with a plus or minus cylinder held with axis vertical before one eye, will see that while the sides are parallel, the top and bottom appear inclined. Dr. Southard remarks that a clear image must be seen by each eye; that is, undistorted; yet Dr. Friedenwald has shown that if we place in a stereoscope a representation of the image of an object, as seen by each eye, with a cylinder axis oblique, they appear as if fused into an object having solidity; which proves that distorted images are tolerated, and produce no confusion.

Dr. Price gives no data by which we can distinguish the asthenopia produced by astigmatic refraction and the alleged asthenopia of insufficiency of the obliques; nor does he explain the existence of metamorphosia of individuals who are not astigmatic. No one, in discussing the question of compensatory rotation, in cases of oblique astigmatism, has harmonized the fusion of the horizontal lines with the exaggerated incoincidence of its perpendicular lines, produced by the supposed rotation. In regard to Dr. Würdemann's statements concerning Dr. Gould's method, I quite agree with him, but would again call attention to my experiences as regards the possibility of producing esophoria for distance, while the dynamic convergence power for the near point remains deficient.

REPORT ON THE VALUE OF OBJECTIVE TESTS FOR THE DETERMINATION OF AMETROPIA, OPHTHALMOSCOPY, OPHTHALMOMETRY, SKIASCOPY.

By the Special Committee of the Section on Ophthalmology of the American Medical Association.

Edward Jackson, M.D., Chairman, Philadelphia; S. M. Burnett, M.D., Washington; H. V. Würdemann, M.D., Milwaukee; and J. A. Thomson, M.D., Kansas City.

The members of your committee are all in accord with the view held by most ophthalmologists that the objective methods of determining ametropia can not entirely replace the subjective method with test letters and trial glasses; and that, in so far as the subjective method is applicable, it may be regarded as a court of last resort. Determinations of the refraction by the various objective methods, however, constitute an essential portion of the complete examination of any eye. They are essential parts of the whole, and no examination is complete without their use. The subjective method can no more fill the whole bill than can any one of the objective methods alone. All should be used in every case to avoid errors common to each. Although it is obvious that if the various measurements of a definite quantity are accurate, by whatever means they are made, they will agree.

The range of application of the subjective method is strictly limited to the determination of refraction at the fixation point, for patients of sufficient intelligence and honesty, with eyes possessing sufficiently good vision. It also requires a considerable amount of time for its application, varying with the form of ametropia present; and, where relied on alone, this consumption of time is, for the more difficult cases, an extremely serious drawback and (by exhausting the patience of the surgeon and the endurance of the patient), a source of possible inaccuracy.

The objective methods of measuring ametropia are of value:

1. By effecting a saving of time; and by this, and as confirmatory tests, securing accuracy.

2. They are applicable to cases and to uses for which the subjective method is entirely inapplicable and useless.

Thus the objective methods can be applied to determine refraction in the eyes of small children, in the mentally defective and in the lower animals. Also in the eyes of malingerers, conscripts, applicants for pensions, insurance, or society benefits, plaintiffs claiming damages for injury, or in general wherever the coöperation necessary for the subjective test is lacking, because of lack of intelligence, perversity or self-interest.

Ophthalmoscopy and skiascopy are also applicable to the determination of the refraction of points outside of the macula and outside of the retina, as the prominence of a swelling or the depression of the cup in the optic disc, or the position of opacities in the vitreous.

Again, keratometry (ophthalmometry) and skiascopy are of value in determining certain facts of scientific interest and importance, as the curvature of the cornea either in the visual zone or elsewhere with the ophthalmometer; and the position and limits of the visual zone, and the total refraction of the eye outside of it by skiascopy.

The objective methods are applicable in blindness and in amblyopia of all grades.

As specified in the resolution under which this committee was appointed, our report is concerned only with ophthalmoscopy, ophthalmometry and skiascopy, and in our opinion these are the objective tests of practical importance. It is concerned, too, only with the value of these tests, not with the methods of performing them. And although their value obviously depends on their form, and the skill with which they are applied, these will only be referred to in that our estimate of their value supposes them to be applied with the skill attainable by careful training and considerable experience, and in their best form. That is, for the ophthalmoscope, we suppose the use of an instrument with a continuous lens series in a thoroughly darkened room, where the pa-

tient will have a range of vision of four meters or over, conditions that it is perhaps the exception to find fully complied with in ordinary practice.

The ophthalmometer is to be used with the light from one-eighth of a hemisphere of clear sky, or the best artificial illumination; and so far as it is possible, the eye under examination is itself to be shielded from light. There must be steadiness of the instrument with the patient and surgeon in comfortable positions.

For skiascopy, is required the use of a sharply bounded, sufficiently small source of light, adjustable to the position of greatest accuracy; and a mirror with the sight-hole of not more than three millimeters, free from reflections.

As to the question of the use or non-use of mydriatics, there is no general difference between the subjective and objective tests. Either measures the refraction as it is found at the time of measurement, whether that be the true static refraction or something different. The objective tests are, however, to this extent slightly more favorable to the determination of the true static refraction. With the ophthalmoscope, strictly under the conditions mentioned, there is without a mydriatic, a slightly greater tendency to relaxation of the accommodation than with the test lenses and test letters.[1] With the ophthalmometer, the corneal astigmatism which may be the total astigmatism of the eye (but generally is not) is entirely independent of a mydriatic. And, with skiascopy, the total astigmatism present at the time of measurement can be ascertained with more certainty and accuracy than is usually possible with the test lenses in the presence of accommodation.

VALUE OF THE INDIVIDUAL TESTS.

Ophthalmoscopy.—The measurement of refraction with the ophthalmoscope enables us to immediately assign an approximately just share to the influence of ametropia in causing imperfect vision. The first ophthalmoscopic examination will in general give us the basis for a preliminary or approximate diagnosis of the refraction; the lens required to give the clear view of the fundus informing the observer of the hyperopia or the myopia present, and the distinctness of the view that it gives indicating the presence, degree and regularity of astigmatism. And all this is accomplished in perhaps a fraction of a minute.

The ability to measure by their refraction the relative position of different points seen by ophthalmoscopy, gives it an important value very imperfectly shared by skiascopy alone.

Of the ability of the ophthalmoscopic examination to reveal latent hyperopia, there must always be some doubt, for in a certain proportion of cases it fails to accomplish it. In this matter of rendering manifest the total hyperopia, it has not, in our own experience, shown any very pronounced superiority over the subjective method. Of the exactness of the determination made with it, we accept the statement of Loring that it will measure hyperopia or myopia to within 0.5 D. or recognize the presence of 0.75 D. of astigmatism and the direction of its principal meridians.

It must be clearly understood, however, that this accuracy can not be attained by all observers, or by any observer at all times and in all cases. There are some surgeons who fail to learn how at any time to completely control their accommodation, at least until an age is reached when the accommodation normally ceases to be a factor to be dealt with. And, what is of more importance, all observers with considerable accommodative power are, after periods of prolonged or difficult eye work, likely to find their control of accommodation impaired, and their measurement of ametropia with the ophthalmoscope unreliable. Thus after a somewhat prolonged effort to obtain a clear ophthalmoscopic view of the fundus of an eye presenting astigmatism, the subsequent ophthalmoscopic determination may vary quite notably from accuracy.

The most serious hindrances, however, to constant accuracy of the ophthalmoscopic examination of ametropia are those dependent on the eye of the patient. If the patient's pupil be unduly small, the accuracy obtainable by this method is correspondingly diminished by the diminution of the circles of diffusion on the observer's retina. On the other hand, if the pupil dilate moderately, as it does in the majority of cases in a thoroughly darkened room, portions of the dioptric media will be exposed at the margin of the pupil that differ materially in their refractive power from the visual zone, and thus the refraction which may really be obtained by the refraction ophthalmoscope will differ essentially from the refraction of the visual zone which is sought.

On these accounts, the best observers we have known have been liable at times to inaccuracies of one or two dioptres in their ophthalmoscopic determinations of moderate ametropia, especially astigmatism, and in high myopia, more especially with astigmatism, the error is even greater, sometimes amounting to four or five dioptres.

Ophthalmometry.—Ophthalmometry would be more appropriately named *keratometry*. Had it been so designated from the start, some current errors with reference to its significance and value could scarcely have arisen. It measures the curvature of the cornea and this curvature alone. Its value as a test of ametropia, is entirely dependent on the relation of the corneal curvature to the total refraction of the eye.

What we have to say, refers to the instrument of Javal, the only one that has proven of importance in ordinary practice. As commonly used, it does not measure a continuous curve, but simply the angle between the two points of the cornea from which the margins of the mires (which constitute the extremities of the test object) are reflected. Between these two points or anywhere beyond them, the curvature of the cornea may essentially differ, though as a rule this curvature in the region measured is practically regular.

By measurement of the curvature in different meridians, the existence and amount of corneal astigmatism is determined to within 0.25 D., or less if the patient be steady, the other conditions favorable and the observer's vision not impaired by irradiation.[2]

The directions of the principal meridians of the corneal astigmatism are also determined with an accuracy dependent somewhat on the amount of astigmatism, but even for low degrees with practical exactness. Thus for astigmatism of 1 D., the principal meridians may be determined within 5 degrees. In a few cases, the meridians of greatest and least curvature vary noticeably from a right angle with each other. In such eyes, the direction of the meridians of the part of the astigmatism that is regular, (that is, the part which can be corrected by a cylin-

drical lens), must so far as ophthalmometry goes, remain in doubt.

We do not find marked variations in the curvature of the cornea at different observations, but believe that where such variations are noted, they are usually either due to unsteadiness of the patient's eye, causing a different part of the cornea to present, or where noted at different times, may be due to changes in the adjustment of the instrument.

What the ophthalmometer reveals is entirely independent of the influence of mydriatics; the curvature it measures, remaining precisely the same in all conditions of accommodation or when the accommodation is entirely paralyzed. But the ophthalmometer being simply a keratometer, gives no information as to the degree of hyperopia or myopia present; and only indicates what may be the total astigmatism if that conforms to the corneal astigmatism. Of the conformity of the corneal to the total astigmatism, statistics now before the profession enable us to judge. From them we draw only this conclusion, that the chances of conformity between the corneal and total astigmatism are not sufficient to justify reliance upon the ophthalmometer as a means of showing the cylindrical correction required in the individual case.

The practical value of ophthalmometry, therefore, is mainly that of a method of examination that will make an important suggestion as to the presence, degree, or direction of astigmatism, which when followed up by other methods of measurement, may effect a greater saving of time.

In addition to this, it is possible that when accurate ophthalmometric records have been made of the curvature of a cornea, subsequent changes in its curvature may indicate the occurrence and amount of change in the total astigmatism.

Aside from these practical applications of the instrument, it has a scientific value, and must be regarded as offering a necessary method for the elucidation of certain important scientific problems as to the existence and change of ametropia.

Skiascopy.—Skiascopy is on the whole the most accurate and reliable objective method of estimating ametropia. It measures the total refraction of the eye, whether this be the static refraction or the refraction modified by accommodation. Applied in the direction of the macula, it measures in the visual zone exactly the refraction that is measured by the subjective method; and at the same time, it measures refraction outside of the visual zone, as it is possible to measure it in no other way.

For eyes having a distinct and sufficiently extended visual zone, it is accurate to within one-eighth of 1 D.[3] In its power of detecting latent hyperopia, that is, of allowing latent hyperopia to become manifest while the measurement is being made, it does not differ materially from ophthalmoscopy or from the subjective test. But, it is, if anything, slightly inferior to them.

The accuracy which is possible with skiascopy in the individual case is limited mainly by the definiteness or indefiniteness of the visual zone. When a certain portion of the dioptric media, large enough to be readily identified and studied, has the same refraction and is definitely bounded, the degree of ametropia of this portion, its hyperopia, myopia, or astigmatism, can be determined within the limits of accuracy named. When, however, this visual zone is too small to study at a convenient distance or the refraction passes by imperceptible gradations into entirely different refractive conditions surrounding it, the difficulty of applying the test is greatly increased and the accuracy and certainty of its results diminished.

The eyes in which a definite visual zone can be isolated and studied are the rule; those in which this is not possible the rather rare exception. The degree of accuracy attainable in these latter cases will depend almost wholly on the minuteness of the study, a minute study being only possible at a comparatively short distance with especially arranged conditions of illumination. Such a study requires great care and patience, but with it even high grades of irregular astigmatism will often yield a distinct visual zone capable of comparatively accurate correction by lenses, which the test will indicate.

Skiascopy, therefore, offers for most eyes, a method for the easy and rapid measurement of ametropia, within the limits of practical accuracy for even the subjective method, except in eyes having more than the Snellen normal standard of visual acuteness. For the exceptional eyes, in which it is less accurate, it offers a means, which, carefully used, will give confirmation of subjective results, or a better correction than may be obtained by any other method. In nearly all eyes the result of a careful skiascopic correction will give the best or very nearly the best obtainable vision.

In addition, skiascopy informs the surgeon, as does no other method, in what portion of the dioptric surfaces the visual zone is situated, and gives him definite knowledge as to what changes in the optical requirements of the eye will be brought about by a change in the size of the pupil. It may, therefore, be relied on to indicate (while the pupil is dilated) whether in the individual case a repetition of the subjective test is especially required or advisable, after the recovery from the influence of a mydriatic.

In conclusion, your Committee would urge that the accurate determination of ametropia is best accomplished by the use of all of these objective methods in each case, and usually, in the following order:[4] The ophthalmoscopic examination, measurement of the cornea with the ophthalmometer, skiascopy—these to be followed by the subjective determination, and, if this last does not agree with the previous measurements, its findings should be submitted to re-trial by skiascopy.

Even when this plan is followed, the accuracy of results obtained will depend on the experience, habitual accuracy of observation, physical health, mental alertness, and conscientious care of the observer. But without some such plan, the best observer will fail to do his best work; while with it, the poorest will be able to make the most of such skill as he has.

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[1] Ophthalmoscopy without a mydriatic is relatively of greater value in revealing latent hyperopia than the subjective tests, but when the eye is under a mydriatic, the subjective method in intelligent patients is a superior test.—H. V. W.

[2] As the instrument is now made with a low degree of magnifying power and from the coarse adjustment of the lines thereupon ensuing, I do not consider it reliable for the corneal measurement under 0.25 D., but as this is the usual interval of the weaker lenses, this is sufficiently accurate for practical purposes.—H. V. W.

[3] May be this accurate in some instances.—S. M. B.

[4] I prefer to use the ophthalmometer before the other two forms of objective examination, since by it in a moment the amount of the corneal astigmatism is acquired and which may be taken as a guide in ophthalmoscopy and skiascopy in the search for the total astigmatism. Especially as the final measurements by the latter test are usually made under mydriatic, and keratometry may be done during the first few moments of a preliminary examination.—H. V. W.

RETINOSCOPY AS A CRUCIAL TEST IN MEASURING ERRORS OF REFRACTION.

Read in the Section on Ophthalmology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

BY B. ALEX. RANDALL, M.A., M.D.

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Except in the early-demonstrated value of retinoscopy in the recognition of conical cornea, as set forth by Bowman, the claims for the method seemed decidedly exaggerated by Cuignet and other early advocates; and my study of it (as practiced with the concave mirror) affording no prospect of large usefulness, I dropped it almost entirely. In the spring of 1884, however, I began to employ the plane mirror in the test, and have ever since held it to be the most delicate objective test in measuring the refraction and its anomalies. Believing it to be unequalled in certain respects by any other procedure, I desire here to define the limits within which I particularly value it; and this the more, as I believe I differ from the general practice.

In my routine examination of a patient, retinoscopy follows the subjective tests for far and near of the vision and muscle balance. In the moderately darkened room, with an argand burner shaded by a metal chimney presenting an opening an inch and a half in diameter, the light is thrown by a plane mirror from a distance of three or more meters, while the patient gazes at a dark surface behind me. Under these circumstances a medium pupil (four to six millimeters, is almost invariably obtained, in which there is rarely any difficulty in seeing and determining the motions of the shadows. M. and H. are thus readily differentiated, with the presence and axis of any astigmatism, and a rough quantitative estimate can be made from the distinctness and rapidity of movement of the shadow. Mixed astigmatism, usually the most difficult error to uncover, is by this method the easiest and most unmistakable. With very narrow pupils, hazy media or unsteady patients, some little difficulty may compel a closer approach; but if the examiner's head be a little lower than the patient's, this can generally be avoided and the test satisfactorily made at even greater distances. As the pupil is not strongly illuminated, the mirror must have an ample sight-hole, free from annoying reflections.

Having thus qualitatively determined the refraction, I then pass to the ophthalmoscopic examination in the upright method, and while investigating the media and the tunics, measure the degree of any refraction error. The corresponding glass or combination is then placed in the trial-frame before the eyes and its accuracy tested—by the test letters, if desired—or where the subjective tests can not be trusted, I proceed at once to the crucial employment of retinoscopy.

For this, some painstaking in the illumination may be required in order to give readily the desired accuracy. Theoretically, we should obtain the emmetropic appearance at a distance of four meters only when M=.25 is present. Practically this rarely holds good, probably because the pupil is wide enough in most cases, even when no mydriatic has been employed, to give a peripheral refraction higher by thus much than that at the pupillary center, and also because we usually compare results with the subjective correction for six millimeters, which is slightly over-correcting for distance. I look therefore, for a central, comma-like shadow, rotating or varying with the shifting light, yet moving neither against nor with the motion of the light upon the face. If this be obtained with +.75, for instance, it will be found that +.90, the old 42, gives a distinct myopic shadow moving in the pupil against the mirror, while +.65 is as clearly an under-correction and gives a shadow moving with the mirror. So it is fair to claim that errors as small as 0.1 in any or all meridians can be recognized by this method under favorable conditions. Indeed, I have seen cases where 1 D. was as clearly too strong as .90 was too weak; and one could assert that there was not so much as .05 D. of astigmatism. For this minuteness of measurement is as true of one meridian as of all; and the axis of any uncorrected astigmatism can generally be determined within 5 degrees with the same ease and accuracy. It seems just to say, then, that this is the most minutely exact measure at our command.

It is a tedious business to do the coarse focusing of your microscope with the fine adjustment screw; and in like manner this method is not the readiest for the work intermediate between the rough qualitative and the minutest quantitative measurement. For this Dr. Jackson's method with the artificial far-point excels it. But within its proper field the plan deserves fuller recognition and employment; and only the "too old a dog to learn new tricks" is likely to fail of satisfaction with it.

I have sometimes met the claim that special skill or exceptional sharpness of sight are requisite to succeed with this method. My possession of V=6/IV. is doubtless no drawback in the use of it; and practice unquestionably facilitates control of the illumination, so as promptly to throw it into the pupil four meters away, and then precisely to make the small rotations of the mirror requisite to give the play of shadow in any desired direction. But I can not perceive that I have in ten years much improved beyond the skill gained in the first few months; and I have frequently brought a doubting tyro to unhesitating recognition of errors of 0. 1 D. in a demonstration a few minutes in duration. The artificial eye, especially that of Frost of London. is an excellent aid to the beginner, although in some respects work with it is more difficult than with a tractable patient.

Finally, a word as to the utilization of this hair-splitting aid to accuracy. With intelligent, sharp-sighted patients the subjective tests are doubtless the most satisfactory for deciding minute differences; and the coöperation of the patient and his subsequent loyalty to your decision, can generally be thus best secured. Yet the objective tests often greatly aid us to help a doubtful patient to a decision, and the moral effect of independence of his answers is in every way good. With patients less well endowed, as so many are, retinoscopy rises rapidly in importance; and in intractable cases it can easily guide us when nothing else but the direct method can be used. The expert in this procedure may ask for nothing better. although it is a question if one can at all times control his accommodation and precisely allow for his own refraction; and where Loring was doubtful about accuracy to fractions of a dioptry, he who would be correct to one-tenth must be an ophthalmoscopist indeed. Even to such a one, it may at times be a great gain

to be so precise when fatigue or headache has set the ciliary muscle in a worry.

It is in the public clinic, where much of the detail work must be delegated by the chief, who must yet shoulder the responsibility of it all, that this method of retinoscopy has its most striking value. In one of my services, where a dozen or more refraction measurements had to be made each day, it was easy to give by the ophthalmoscope a rough estimate of the refraction to an assistant, who might be a mere beginner; and when he had finished his subjective tests and marshalled into the dark-room his patients wearing the correcting lenses in accord with his findings, it took a very few seconds to verify or revise his work in each case and to prescribe the glasses with full assurance of the precise error of refraction. Any error in the position of a cylinder or the strength of it or of a spherical could be at once detected, rectification made, and the result verified. Some men do not desire this accuracy in their hospital work; others will not take even this small trouble to obtain it; but to the conscientious ophthalmologist it is clearly needful, and it will be readily possible by this method of retinoscopy.

THE STATUS OF SKIASCOPY.

Read in the Section on Ophthalmology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5–8, 1894.

BY H. V. WÜRDEMANN, M.D.

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It is conceded beyond all doubt by those practiced in the objective methods for determining the ocular refraction, that skiascopy holds the first place as regards accuracy and minuteness of measurement. This you have learned from the special committee appointed last year and empowered to report at this meeting. The sum of our report may be put in one sentence: *The objective tests are essential to the proper examination of the ocular refraction and, although but preliminary to the subjective method, reduce the latter to simple proving of lenses found by the former, eliminating in a great measure dependence on the faltering judgment of the untrained patient, substituting therefor the skill of the expert who, reasoning from scientific data, is thus able to fit glasses in less time and more accurately with consequent satisfaction to himself and his patient.* Keratometry, ophthalmoscopy and skiascopy; "the greatest of these is" skiascopy. Thus in a few words you have the standing of the method designated by those familiar with the same.

This paper is not written for these, but for those on the outside who, either through ultra-conservatism, laziness or inability to master its minutiæ, have not yet taken up the shadow test. It is a painful fact that there are men, in other respects good ophthalmologists, whose refraction work is but on a par with that of the glass-selling jeweler and the average optician. They pin their faith to the trial set and to the patient, whose hesitating replies are a constant source of error. As refraction examination forms fully one-half of the oculist's work, such must give way to those skilled in *measuring the eye.*

The estimation in which skiascopy is held by our eastern *confrères* is shown by the fact that a whole week is given up to the teaching and application of *this method alone* at the Philadelphia Polyclinic, in a series of twenty-seven lectures and clinics by a large corps of professors, instructors and clinical assistants.[1]

From the perusal of recent English and German literature, it would seem that even though the shadow test has been in common use in this country and France for a decade, the profession on the other side has not taken up the method to the extent that we have. In this country, I think that it may be said all of the progressive workers use it and do not consider the refracting of any case complete unless skiascopy has been called into service. Within a couple of years the acquisition of this method will be deemed as necessary by the foremost specialists of all the world as it is here. Six years ago I was astonished by the ignorance of the German oculists regarding skiascopy, as it was then, as now, foremost in my mind as being the principal objective method of measuring the eye. It is different now, and I understand that the shadow test is being generally taken up even in the clinics of Germany. Personally, I voice the opinion of its value given by your committee, and use it a number of times a day in my private practice.

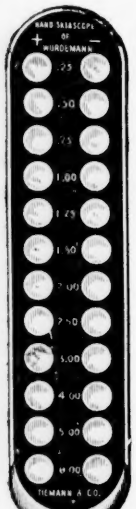
In what cases should the shadow test be used? I should say in *all* patients for whom lenses are to be prescribed. I hold it to be an absolute necessity for the scientific refractionist to know in every instance the total refraction of the eye before putting on lenses. I would no more think of fitting spectacles to a presbyopic patient, by trying lenses at the near point alone without knowing his refraction, than I would of prescribing glasses in ametropia by one or more of the objective tests without recourse to the subjective method for confirmation.

The few instances in which skiascopy is unreliable or inapplicable are limited to those cases in which a definite visual zone can not be isolated. These eyes are the exception and yet where carefully used, in irregular corneal curvature, in conical cornea, in partial lenticular or corneal opacities and in very high grades of astigmatism, skiascopy is of value as a confirmatory test. "In nearly all eyes the result of careful skiascopic examination will give the best obtainable vision."[2]

For skiascopic results to agree with those elicited by prolonged subjective tests, the examination should be conducted in the visual line, the refraction of the macula only being measured. Skiascopy measures the static refraction of the eye when applied in the visual zone, exactly as it is at the time of the examination, whether modified by the accommodation or not. Thus, in young persons, as a rule, a mydriatic should be used. Skiascopy is of value in proving of measurements found by the other methods, just like the proving of an example in vulgar fractions: By again applying the shadow test with the combination of lenses decided upon from the trial case. It may thus be used as a check upon the other methods and upon itself.

Aside from the difficulty of acquiring the technique, (although not nearly so much time is taken by the tyro in learning it as is necessary for accurate ophthalmoscopic measurement), I would consider that the want of proper facilities for placing correcting lenses before the patient has been one of the greatest obstacles to the general adoption of the method. If

it be remembered that but one meridian can be considered at a time, and that the neutralization or reversal of the shadow movement by spherical lenses accomplishes the same purpose for the meridian under observation as cylindrical lenses, much of the difficulty is done away with. The placing and replacing of lenses in a trial frame is very consumptive of time, and the test case itself occupies too much space in the ophthalmoscopic dark room, which is usually but a closet.



To obviate these disadvantages, Doyne,[3] of Oxford, Eng., in the Ophthalmic Section of the International Congress held in Washington in 1887, exhibited a large rotary disk containing many plus and minus lenses. Burnett's[4] and my own[5] rotary disks, modifications of this, were more simple, but mine at least has been laid on the shelf for several years, as being too cumbersome. The simple hand skiascope,[6] here shown has all their advantages and the model I present has been used in my work several times a day for nearly four years, and I understand has been given a place by a number of our colleagues. This you see is a simple blade of hard rubber which contains twelve plus and twelve minus lenses. The patient raises and lowers the instrument at the word of the examiner until the neutralizing lens is found, the strength of which is always plus .75 D. greater than that of the actual ocular refraction in this meridian, and this over-correction should be allowed. The sphericals found by direct ophthalmoscopic examination are usually worn by the patient in a separate frame behind the instrument. I find it convenient to have a couple of pairs of reversible spectacle frames in my dark room containing the one a + 1. D. and + 2. D. lens, and the other a + 3. D. and a + 4. D. lens; the strength of which when used for higher degrees of hyperopia is added to that of the instrument.

This simple instrument overcomes the principal difficulty in the use of the method. Thus skiascopic examination as practiced by myself and colleagues takes but a minute or two, the test itself giving mathematical data from which scientific conclusions are reached.

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Sewage Disposal by Crocodiles.—One of the representatives of Ceylon at the Columbian Exposition is said to have proposed a plan for the "destruction of the offensive matter now passing into and festering in the river and imperiling the health and lives of the citizens, without necessitating any alteration of the existing system of sewerage." The plan of the Ceylonese "sanitarian" is to construct at the sewer outfalls, suitable enclosures in which to rear and keep "crocodiles and alligators to serve as scavengers—a service which, from the fact of their being omnivorous, I am convinced they are eminently well qualified to render." The veracious chronicle in which this precious plan was published is said to have viewed the matter seriously.

THE VISUAL ZONE OF THE DIOPTRIC MEDIA AND ITS STUDY BY SKIASCOPY.

Read in the Section on Ophthalmology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

BY EDWARD JACKSON, A.M., M.D.

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One is liable to get the impression that, in eyes with perfect vision, only focused light reaches the retina, although the incorrectness of such an impression is readily demonstrated in various ways.

If we close the lids in any strong light, we can demonstrate that sufficient light reaches the retina through them to give quite accurate quantitative perception; and about the same amount of this light reaches the retina through the lids and the sclera when the eyes are open and in use for distinct vision. The ability to light up the interior of the eye by oblique illumination through the sclera or iris, we have all demonstrated. But skiascopy has shown that even through the pupil, always in the dilated pupil, often in the pupil as contracted by the ordinary daylight, a considerable part of the light entering, often the greater portion of it, reaches the retina unfocused.

While a flood of such unfocused light renders very accurate vision slightly more difficult and tiresome, it does not prevent it. The conditions may be likened to those that are obtained when a convex lens is held so as to form an image on a piece of paper in a well lighted room. A large part of the light reaching the paper is not focused light, and the image formed is on that account less vivid, yet more careful examination shows that it is comparatively distinct and quite complete. When the mixture of diffused and focused light falls on the retina, the former seems to interfere still less with the perception of the image formed by the latter, so that a comparatively small proportion of accurately focused light with a much larger amount of uniformly diffused light will still enable one to see distinctly.

The portions of the dioptric media through which the light is perfectly focused upon the retina I have termed the visual zone. Existence in the pupil of a visual and extra-visual zone, with some of the facts dependent thereon, have been impressed on me by prolonged use of the shadow-test, and I am conscious of having very slowly come to some realization of their full significance and importance. They have a most important influence upon the practical application of all methods for the measurement of ametropia, but the exact nature and significance of that influence is only revealed by skiascopy.

The fact that we are able to see by the focused light in the presence of much that is unfocused, enables us to use the subjective method; and the fact that only the focused light impresses consciousness by recognizable sensations has, in a large proportion of cases removed the subjective test from the inaccuracies and uncertainties that would otherwise be due to the admission of light through the extra-visual zone.

The existence of an extra-visual zone presenting refractive conditions entirely different from those of the visual zone, is a great obstacle to accuracy with the direct method of ophthalmoscopy. With skia-

scopy, however, the observer has spread before him, as it were in a complete map, the pupil in each portion of which the refractive conditions may be separately studied, and it is this opportunity offered for isolating and studying alone the different refractive conditions that occur in the same eye, that is the supreme advantage that skiascopy has given to the ophthalmologist. All else that it does can be done by other methods, and in other respects it is only the time-saver or confirmer of other methods. In this it stands entirely alone, and the information that it gives is just that which was needed to make practical physiologic optics an exact science.

The practical importance of the study of the visual zone, and the relation of its refraction to that of other parts of the dilated pupil is very great, and the facts revealed by such a study will powerfully influence the prescription of correcting lenses. How great this importance is and how much the practice of lens prescribing is likely to be influenced will only be appreciated by one has made at least a few careful studies of this kind. Leaving it aside for some future communication, I wish simply to speak now of essential methods for such study.

The area of the pupil that may be regarded as having the same refraction depends on the exactness or minuteness of discrimination that it is desired to make. If one says roughly a certain eye is hyperopic or a certain eye is highly myopic, this may apply to the whole dilated pupil. If he says the eye has so many dioptres of hyperopia or so many dioptres of myopia, and is willing to ignore variations of less than 1 D., what he says may apply to the whole of the pupillary area as it exists under conditions of ordinary illumination. But, if he desires to be more discriminating, to recognize the smallest differences of refraction that can be recognized by skiascopy, he will find in almost all cases that such a pupillary area presents marked variations. And, in a certain number of cases of eyes that would not ordinarily be regarded as exhibiting conical cornea, or marked irregular astigmatism, the area of the pupil even contracted by strong light and for near work will show variations in refraction of the greater part or a whole dioptre.

From these facts, it follows that the accurate application of skiascopy, the careful study of the visual zone and the relation of its refraction to that of the surrounding proportions of the pupil is a study of the *movement of light and shadow in small areas* of the pupil, not across the pupil as a whole.

To study a small object one must bring it near the eyes; hence such studies of the pupil must be made within a comparatively short distance. Distinct movements in an area three millimeters in diameter can not be conveniently studied beyond the distance of a meter and can be most readily studied at a considerably shorter distance. There are not a few eyes capable of visual acuteness quite up to the normal standard, in which the light that goes to form definite images enters through a smaller area of the pupil than this, and the true refraction of the eye, therefore, can be studied only at a shorter distance; a distance of one-half or even one-third of a meter.

Again, to have a distinct area of light in such a limited space, it becomes highly important that the source of light be small. Such a study can not be made unless the ordinary lamp flame be covered with an opaque chimney with a small aperture. For my own work, with the plane mirror, I have for the last year found an aperture giving a circle of light five millimeters in diameter most satisfactory. With such a source of light, properly placed close to the mirror, and the sight-hole of the mirror not more than two and a half or three millimeters in diameter, the study of the movement of light and shadow is as easily made at one-half meter, revealing the differences of refraction in different parts of the pupil, as is the rough study at one millimeter distance or more, by the methods ordinarily described which have so frequently misled the surgeon.

Recently, some of the best skiascopists have spoken of the test as being in some cases misleading. I am sure that it is misleading only when the movement of light and shadow is studied in the wrong part of the pupil. If one recognizes the true visual zone, and goes close enough to study the movement within it, the movement of light and shadow can no more mislead him as to the condition of refraction than a convex lens can have the effect of a concave.

We are dealing with simple physical facts. The misleading, I believe, invariably comes about by the surgeon's watching the movement of light and shadow in the extra-visual zone, and the chances of falling into the error are directly proportioned to the distance of the surgeon's eye from that of the patient and the consequent apparent smallness of the pupil.

With great variations in the state of refraction present in almost every eye, with the most of ophthalmic surgeons applying skiascopy in such a way that it was impossible to discriminate between the visual and the extra-visual portions of the pupil, it was no wonder that the test was regarded as one of uncertain value and not to be entirely relied upon. With the recognition of the real optical conditions to be dealt with, this uncertainty and distrust will disappear and the test will take its place for certainty and accuracy along side of the subjective test for intelligent, honest patients with perfect vision, and as distinctly superior to the subjective test in all other cases.

Such an application of the test is a very different matter from its use for a rough approximate determination of the refraction in which it has heretofore rendered most service. The phenomena to be dealt with opens an opportunity for the exercise of the highest skill in observation and the application of the most considerable experience. In my judgment, no other method of studying the refraction of the eye compares with the full application of the shadow test, either as to the possible value of the results to be attained or in the difficulty of the *complete* mastery of the method.

To demonstrate roughly the general refraction of of the eye, skiascopy is the easiest objective method. It may be grasped even by the tyro in a single lesson. But to reveal its full possibilities of delicacy and accuracy it will always require years of careful and intelligent application.

DISCUSSION.

Dr. F. B. Eaton—In the employment of the several objective tests under discussion without mydriatic, I prefer to begin with skiascopy. since a certain amount of accommodative adjustment is brought about by the subjective tests and by the fixation by the patient of the tube of the ophthalmometer.

I employ the ophthalmoscopic mirror with Dr. Würdemann's skiascope and without a mydriatic. If the pupil is

small, the patient must fix some object considerably to the right or left that a reflex may be secured; hence the importance of a very dark room and covered flame. I occupy a middle ground between the extreme views of those who eulogize and those who take as partial only the findings of Javal's ophthalmometer. I believe that many of the discrepancies between its findings and those under mydriasis result from imperfect illumination, and because the patient's head is not level. This latter defect can be remedied best by the American model, which provides a horizontal slit through which the observer can insure the levelness of the patient's brows with the top edge of the slit. Again, the patient must fix a point on the anterior lens of the instrument, which is in its axis, since then the observer measures the cornea at that portion cut by the visual line.

DR. S. B. DAVIS, Stockton, Cal—In my use of the ophthalmometer, I have found that I had better results in most cases by placing the axis at 90 degrees, if the instrument showed it to be near 90.

DR. SIMONTON, San José—While the objective methods mentioned are theoretically within certain limits correct, yet it is a fact in practice that many mistakes are made by those relying almost wholly on these methods. Many of these cases require refitting, and ordinarily by use of the old trial case. Inasmuch as the various objective methods afford latitude for the exercise of much judgment, it is evident that all ophthalmologists are not equally endowed with skill and acuteness of judgment and this, accompanied by usual haste, results in many mistakes.

DR. R. D. GIBSON, Youngstown, Ohio—The results are not always the same in the same eye. A case showing plus .50 D. astigmatism may, after some months of over-taxation in school, return with conjunctivitis and an increase of the corneal astigmatism. This increase I have seen reach as high as 4. D. and after relieving the conjunctivitis and blepharospasm, the high degree of astigmatism vanishes and the results of the first examination found to be correct. Again, I have found astigmatism for which I have prescribed correcting lenses with great comfort and satisfaction, and after some months or a year, find no astigmatism, and only a spherical correction necessary.

DR. FRED BAKER, San Diego, Cal—To repeat much that has been said, I wish to plead for greater charity in our treatment of our brother practitioners when we are called upon to overhaul their work. I have grown more charitable since finding that as large a share of my own cases show slight changes in a second test made after six months or a year, as of those which come to me from other practitioners, though I know that the first tests of my own patients were carefully made. Every one must find that certain patients show these changes after a time, which must be due to the relief of strain given to the ciliary muscles by the wearing of the first pair of glasses.

As to objective tests, while it must be true that all of us in the rush of business neglect to give sufficient time to all patients, still it must be admitted that the oculist who combines most methods of testing will do more accurate work than he who uses only one. I have yet to meet personally any ophthalmologist who has given any of the objective methods a full and careful trial, who has not admitted the practical value of the method.

DR. W. E. BRIGGS, Sacramento, Cal—I agree with Dr. Riley in the statement that the trial test case will be our last and most important means of ordering glasses; but the more the profession uses the objective methods the more general they will become. I believe in time all ophthalmologists will use both skiascopy and Javal's ophthalmometer. These methods of testing are not always necessary, but cases are common in which we can not readily obtain a result without some objective test. As for myself, I would feel quite at a loss to make my examinations without the ophthalmometer and skiascopy.

DR. ALBERT R. BAKER, Cleveland, Ohio—I am pleased with the report of the committee in that they have given great prominence to skiascopy as an objective test for the determination of ametropia. In 1891-'92 I spent considerable time in the Royal London Ophthalmic Hospital (Moorfields) about the time skiascopy was first introduced in that institution. Probably one-half of the patients applying for relief could not read and we found this objective test of great value in these cases. Upon returning to this country in 1883, I published several papers on this subject but as they received but little consideration I became somewhat discouraged in attempting to secure a hearing. I was greatly pleased when Dr. Jackson took up the subject and succeeded in placing this objective test where it belongs as one of the most valuable. No doubt the present excellent report will serve to make the use of skiascopy more general.

DR. L. R. RYAN, Galesburg, Ill—The use of the old trial lens should not be discarded. The thoughtful physician and progressive man will use all the methods at his command. It is in the majority of cases a matter of personal preference. The man who studies skiascopy carefully and uses it extensively can do better work than one who devotes little time to it. The same might be said of the other methods of refraction. When we consider that the majority of cases of refraction are simple; that is, the axis of astigmatism are regular either 180 degrees or 90 degrees, and that the patients are people of average intelligence and perception, by the use of the trial case we can fit glasses more rapidly and accurately. We have all the benefit of the patient's intelligence as to clearness of outline and ease of glasses. By a careful study of subjective symptoms one can tell almost by intuition what the refractive error is, and in the vast majority of cases can make a rapid fit. In suitable cases, however, skiascopy and all the other methods are excellent, and should be used, but the old trial frame still has a place and an important one.

DR. H. V. WÜRDEMANN—Our branch of therapeutics is the most scientific of all the branches of medicine and this refractive work is or should be the most accurate, as it is based upon physical and mathematical data. The physician who bases his glass fitting upon such ground necessarily does better work than those who depend entirely upon unskilled testimony of the patient. In the opening sentence of the report of your Committee, the fact was stated that the objective tests were a necessary preliminary to the subjective method, and the latter is not to be done away with, but is the court of last resort. We may even go further with the subjective method, and say that the final judgment of the patient himself after he has had our prescription filled, is a highly important point. Thus we can not do without the trial case. The advantages of the objective method have been set forth in your committee's report and I need not repeat them here.

One of the most important offices of the objective method is the clearing up of doubtful points excited by the subjective examination. Thus at the trial case a patient may accept equally well one or any of the following combinations:

Plus .50 sph. ⌒ plus 1.25 cyl.
Plus .75 sph. ⌒ plus 1.00 cyl.
Plus 1.00 sph. ⌒ .75 cyl.

Without repeated sittings, by the trial set alone it would be difficult for the operator to decide which would most nearly neutralize the patient's error of refraction. Skiascopy settles the question immediately to the skilled operator. There has been some question raised as to the fixation

of the patient's eyes. The examination should be conducted as nearly as possible in the visual line of the patient. Fixing the aperture of the mirror would do this, yet reflection of the same on the anterior surface of the cornea would confuse the operator, and when used without a mydriatic, the bright light falling most directly upon the fovea would tend to produce iritic and ciliary contraction. For general purposes it is better to have the patient look over the operator's shoulder at some distant object. I accomplish this purpose by having curtains at the door of my dark room, through which, when slightly opened the patient looks at a wall four meters distant. This method secures relaxation of the subject's accommodation.

In regard to the order in which the tests should be taken up, I consider it advisable to go from the coarser to the finer tests, as the former give valuable hints as to the finer measurements to be expected from the latter; taking up the examination in the following order:

Visual acuteness and astigmatic lines, keratometry, direct ophthalmoscopy, skiascopy, the subjective methods and then skiascopy again for corroboration of the whole test. Naturally, as in any other skilled work, much depends upon the observer, but even to those who either by reason of physical disability or mental hebetude have not been able to acquire sufficient skill for the finest work, these objective tests prove of material benefit.

Dr. Lewis H. Taylor, Wilkes-Barre, Pa.—In regard to the use of the ophthalmometer, I can say that I have recently come to regard it as a most useful aid to the rapid determination of astigmatism. A few years ago in a discussion of this subject we heard the ophthalmometer referred to as an instrument that might be regarded as an interesting toy, and which would soon be relegated to the lumber room as something too useless to occupy the busy oculist's valuable time. Now, Mr. Chairman, I do not so regard it, but I find it daily of more and more value. We mistake greatly if we regard it as an accurate determiner, if I may use the word, of the exact refraction; it is only an aid, but a most valuable aid. I formerly regarded the subjective test with atropia, as the only method worthy of serious consideration, but now I am free to say that I use atropia far less than formerly. Ophthalmometry will not entirely take the place of subjective tests, nor will any other method, but I have frequently had patients return who had been wearing glasses with reasonable comfort for whom I could get a much more satisfactory correction than by the old method. The difficulty too often lies in the fact that some one devotes exclusive attention to one method, and claims too much for it, another tries it superficially and does not get such good results; he denounces the method and discards it. Both are in error; the middle ground here as elsewhere is the safest.

Dr. A. J. Erwin, Mansfield, Ohio—I do not believe it important what instrument, or which of the methods in use be employed in working refraction, so that we are only expert in our method, and expertness is necessary in any method in order to have good work. In regard to the varying of the degree of astigmatism, in any case it is doubtless due to the power of the accommodation at the time of the examination.

Dr. Jackson, in closing the discussion, said:—Dr. Randall, in using skiascopy to obtain his extremely accurate results at greater distance than I have advised, worked with the undilated pupil, thus excluding the extra-visual zone. Yet even then he did not find it necessary to make the theoretical allowance for distance. Now it is a fact that in the majority of cases the refraction of the extra-visual zone shows higher hyperopia or lower myopia than the visual zone, so that for this extra-visual zone such an allowance is out of place. Evidently under these conditions, the results have been appreciably affected by the refraction of this extra-visual zone.

In regard to the illumination of the ophthalmometer, it should be remembered that we are studying the reflection from a transparent membrane, and that its distinctness will depend both on the illumination of the reflected object and on the absence of light transmitted from behind the cornea, and for this reason it is almost as important to keep the eye shaded so as to illuminate the disc and mires.

In reply to the question as to the percentage of cases in which the ophthalmometer can be relied on for the prescription of lenses, I have recently, in 500 eyes, found that the corneal corresponded exactly with the total astigmatism in only 6 per cent. In about 20 per cent. the amount was almost exactly the same; in 60 per cent. the difference was not over 0.5 D.; in 52 per cent. the direction of the meridian corresponded exactly, and in 80 per cent. within fifteen degrees.

As to variations in astigmatism from time to time, it must be recognized that these do occur. They might be expected in progressive myopia, but they occur with hyperopic astigmatism as well. My attention was first called to this in my own case where the astigmatism has increased from 0.50 D. to 1.75 D., and some years ago I published seventeen cases that I had been able to follow from year to year, with determination under mydriatics.

THE MENOPAUSE.

BYRON ROBINSON.
CHICAGO.

Menstruation belongs distinctly to the tubes and uterus. It is a regular rhythmic action. It is controlled by the automatic menstrual ganglia situated in the walls of the tubes and uterus. These rhythmic little brains manifest themselves to the observer by circulatory change and increased motion. Menstruation might be named tubal motion. By direct observation in man and animals, I have noted the following midway between the monthly, or at times far remote from œstrus or rutting. The tubes and uterus are of quite a pale pink color. In short they are not congested, and still. But at the menstrual period or the season of œstrus the tubes and uterus are congested and in active peristaltic motion. The tubes are of a dark blue color from their dilated vessels being full of blood. The congestion of the uterus is intense but not so manifest as the tubes. The tubes are swollen, thickened and edematous. They are soft and pliable.

At this time a slight irritation while removing them soon excites them into active peristaltic motion. After removing such tubes and placing them in warm (salt) water they will keep up vermicular movements for half an hour by gently irritating them. I make these observations in women because I operate at any time in laparotomy, after careful preparation, whether it be in the midst of a menstrual period or remote from it. As regards animals I have examined several hundred genitals of recently butchered sows and the tubal congestion at the œstrus is more apparent in them than women. The sow's uterus is also probably more congested than woman's. Observation and experiments indicate that menstruation is a regular, periodical rhythm of a blood wave in the tubes and uterus induced by the automatic menstrual ganglia. The continually moving wave rises to a maximum and sinks to a minimum. The menstrual wave con-

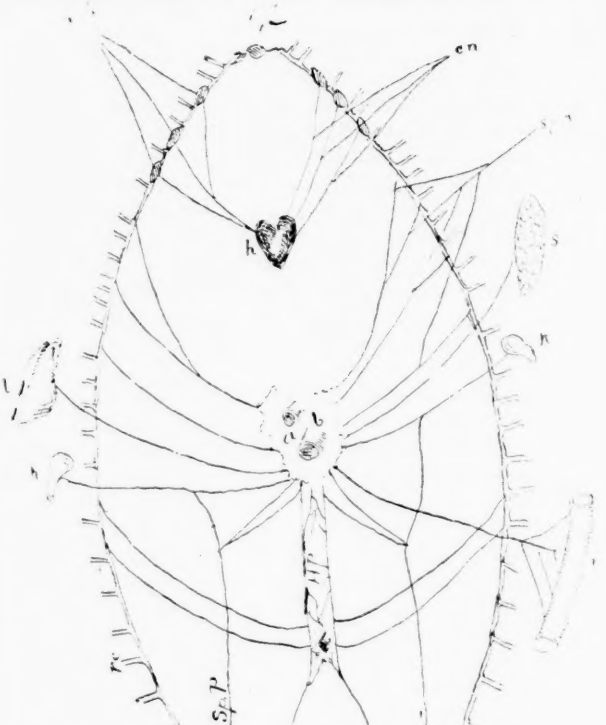
tinues from puberty to menopause. It is a nervous phenomenon.

Ovulation is a progressive non-periodical process. It begins before birth and continues until the ovarian tissue is atrophied or worn out. It is liable to occur at menstruation or œstrus because of the vast blood supply at that time which hastens the follicle to ripen and burst. In the lower animals, so far as I can decide, menstruation and ovulation seem to be coincident, *i.e.*, they occur at the same time. I examined the cow, dog and sheep but my observation is especially based on the ovular and menstrual process as seen in the sow. By the examination of some two hundred and fifty specimens of sow's genitals in all conditions it seems to me that the œstrus of this animal embraced both menstruation and ovulation in one physiologic process at the same time. But as the scale of animal life ascends, the process of menstruation and ovulation seems to become more and more divorced. To my mind the best animal to begin with is the cow. In the cow one can see more and more distinct processes with the ovaries and tubes. Their separate workings become more apparent. In the calf, before and after birth, ovulation is very manifest. But the tubes and uterus before birth and for a considerable time after, are manifestly quiet and pale and rudimentary, nonfunctional. In woman it is my observation that menstruation and ovulation are found distinctly separate from each other. It is true that ovulation and menstruation may occur together, may be coincident but that is an accident. The processes are physiologically separate. In woman one can see ovulation before birth, and I have seen ovulation in a woman of 70, the specimens of which were presented to me by Dr. Burgess, of Milwaukee. Now, of these two great physiologic functions, ovulation is a life-long process. It begins before birth and ends with ovarian atrophy. But menstruation is a periodical process beginning with puberty and ending with menopause.

The menopause ends slowly, as puberty begins. It is frequently difficult to decide which produces the most profound impression on the general system. The popular belief is that the period of menopause is a time of danger to the woman. It is claimed that she is more liable to malignant growths of the genital organs or the breasts, and the average woman expects evils to arise in her, either bodily or mentally. Popular belief that woman is more liable to disease at the menopause is probably correct.

The symptoms of the menopause are: *a*, cessation of the monthly flow; *b*, flashes of heat; *c*, flushes of circulation; *d*, irregular perspiration. The cessation of the flow is a very irregular and indefinite matter, but generally occurs at about 45 years of age. It requires an average of eighteen months for a girl to become regular in menstruation; besides the genitals were being prepared for several years. It requires two and a half years for the monthly flow to cease, on an average. The flow ceases very irregularly even in normally physiologic cases. The flow may be scant one month, not appear at all the next and the third or fourth a flooding may occur. Should the flow cease without pathologic manifestations? I would answer, "No." Many no doubt will oppose this view and say that it is a purely physiologic process and if the woman is normally healthy she should have no manifest disturbance. So is labor a physiologic process, but it is frequently accompanied by pain and other disturbances. The cessation of menstruation means the death of a great function, the atrophy of a dominating organ which has the greatest nerve supply of all the viscera.

The nervous apparatus of the visceral organs may well be compared to the equalizers on the horse-power of a threshing machine. When the ten horses all pull evenly the gearing works uniformly, but the neglect of one team puts the gearing awry, and though the machine may run, its working is not of such fine



EXPLANATION OF FIGURE. A SCHEMATIC DRAWING OF THE SYMPATHETIC NERVE.

X. Ganglion of Ribes.
Y. Coccygeal ganglion (Impar.)
L. Liver.
K. Kidney.
S. Spleen.
Sp.P. (Spermatic) ovarian plexus.
I. Intestine.
A.B. Abdominal brain (center of reorganization).
Sp.N. Splanchnic nerves.
C.N. Cardiac nerves.
H.P. Hypogastric (aortic) plexus (coming from three sources).
U. Uterus, tubes and ovaries.
H. Heart.
C.G. The three cervical ganglia (secondary center of reorganization).

The sides of the ellipse represent the lateral chain of the sympathetic. One nerve strand goes from the abdominal brain (a.b.) to each viscus to represent its plexus. Observe that the spermatic plexus (sp.p.) arises from the abdominal brain, renal plexus and aortic plexus. Any irritation starting in any viscus will pass to the abdominal brain, where reorganization occurs, and the forces are redistributed over the plexuses to every viscus.

balance. The destruction of one function in a well balanced nervous system is sure to destroy the well established balance in the others. So that in my opinion pathologic disturbances may be looked for in the menopause. In order to make my views clear and reasonable, let us construct a diagram of the sympathetic system. Fig. 1, page 346, represents the sympathetic nerves. It is drawn in the form of an

elongated ellipse. At the upper end of the ellipse begins on the cerebral communicating artery at the so-called ganglion of Ribes. The lower end the ellipse ends at the coccyx or ganglion Impar. R. C. shows the connection of this ellipse to the cerebro-spinal axis. The interior of this ellipse is what gives us special interest, for here lies the vast and complicated network of this nervous ring. A. B. indicates the abdominal brain, solar plexus or semilunar ganglia—the center or reorganizing locality of the sympathetic system. From the abdominal brain, renal ganglia and the lateral sympathetic chain, passes off a large plexus of nerves, down to the aorta to the uterus, tubes and ovaries. This is known as the hypogastric plexus. (H. P.)

The observation which I note in the dissection of quite a number of old women, is that after the menopause the genitals not only atrophy, but the hypogastric plexus also shrinks away. It becomes smaller, finer, and no doubt some strands disappear on the entrance of the menopause. On this fact must be based the pathologic symptoms accompanying the cessation of the menstrual function. In dissecting infants which have lain in alcohol for some six weeks, the very opposite condition of the hypogastric plexus may be observed, for in the young child the hypogastric (sympathetic) plexus is disproportionately large and can be very plainly dissected out. The explanations of the disturbances of the menopause may be shown as follows: For thirty years, monthly rhythmic impulses have passed over the hypogastric plexus to the uterus and tube. A fixed habit has been established and the genital organs lie in the assimilating and motor grasp of the hypogastric plexus. The importance of the genital organs is shown by the vast nerve supply sent to them and also because the hypogastric originates in great central sources. It arises plainly out of the abdominal brain, the renal plexus and sympathetic lateral chain. It is intimately and closely associated with the whole sympathetic ellipse. Now, when this great nerve tract, known as the hypogastric plexus, will not transmit the higher physiologic orders it will unbalance all other parts of the ellipse. If the nervous forces can not go over an old established line they will go over the next lines of least resistance. The hypogastric plexus can not carry the orders as it is atrophied and destroyed for the old work. Thirty years of monthly rhythm established in the abdominal brain is not to die without a struggle. This explanation will enable us to understand the many pathologic manifestations of every viscus at the menopause. The irritation which arose by trying to pass more nervous impulses over plexuses than normal, gives origin to what is unfortunately known as "functional disease." It is just as organic as any disease, only we are not able to detect it. Acute atrophy is a pathologic condition and no doubt this is the condition of the hypogastric plexus at menopause.

After the cessation of the flow the most prominent symptom is what is called flushes. Over 80 per cent. of women will experience this peculiar phenomenon at the menopause. I shall include two distinct ideas in this subject. I shall define flushes as a disturbance of the vasomotor centers, and flashes as a disturbance of the heat center. Heat and circulative disturbances are so intimate and go together so frequently that I shall not attempt to separately describe them. Suffice it to say that the heart and vasomotor centers are unbalanced by irritation at the menopause. They may come on rapidly and irregularly for a short period and then remain away for days. The patient would indicate that the disturbances were first manifest to them near the stomach and then rapidly spread over the head and chest. It would seem from carefully watching these women in menopause and listening to their description, that wave after wave succeeds each other. I have watched them under attacks and they seem to be under a desperate struggle to control themselves. The blood vessels of the head and neck seem to be the most affected, yet the skin of the whole body shares in the disturbance. The nerve impulse, *e.g.*, which should be emitted along the hypogastric plexus is abnormally forced over other plexuses and the vasomotor center becomes irritated, resulting in dilatation and contraction of the peripheral vessels. All molecular action generates heat, and it may be that much of the heat experienced is due to the rapid dilatation of the vast number of vessels and the rapid flow of fresh blood in them. As the cheeks glow the woman says she feels hot and the more the skin glows, red with flushing blood the more she claims she is hot. Besides the vasomotor and the heat center being disturbed the sweat center is irritated. The flushes and flashes are followed by various degrees of sweating. The sweating is just as irregular and uncertain. The quantities of sweat vary from a fine moisture to great drops.

The theory of disease at the menopause must rest on the unbalancing of the nervous system by changing the old established nerve channel through which they have carried impulses for a generation. It must rest on actually diseased genitals, or atrophy of the organs on the plexuses which transmit controlling forces to them. Disease at the menopause must rest on some irritating center which is chiefly the genitals and their nerves. Like many old gynecologists we need not look for the sole cause in the ovaries but her trouble is due to reflex irritation. Eighty per cent. of such women suffer in general from nervous irritability. Fifty per cent. suffer from flashes and flushes, which means simply disturbed heat and circulatory centers. Probably 50 per cent. suffer deranged sensations, hyperesthesia and anesthesia. Perhaps 40 per cent. suffer from headache, abdominal pain and perspiration. About 25 per cent. of women at the menopause suffer from leucorrhea, sudden flooding and sweats. This means that all the secretory apparatuses of skin, mucous membrane and centers are deranged. The first thing I search for in such women is diseased genitals, *e.g.*, endometritis is an arch fiend.

Inflammation of some kind may be found in the uterus, tubes and ovaries. Acute atrophy—a form of malnutrition—must be recorded among diseases. If no pelvic trouble be found, examine the whole abdomen and chest for any disorder. I have found that the glycerin tampon twice weekly, and the hot douche gradually increased up to ten quarts twice daily, often cures such patients at least symptomatically. Curetting may be required. Radical disturbances in the menopause mean disease, and generally it is located in the pelvis. Women are expected to suffer from neuralgias at this time, nerve irritation, but their intellect is also often disturbed, especially in the will power. General treatment is right and reasonable. Baths, attention to food and evacuations. The

patients fret and worry and do not rest or sleep well. The bromids act well, especially given at night. I make over half the dose sodium bromid, as that does not irritate the stomach and skin so much as potassium bromid. The bowels are best regulated by having the patient drink a glass of water each night at bedtime in which there is from a half to a drachm of epsom salts with the additional advice to go to stool every morning immediately after breakfast, *i.e.*, after the hot coffee has stimulated peristalsis of the bowel.

Women take on fat at the menopause. This is a form of low grade nutrition. I have examined some half a dozen of this kind of patients who were considered subjects of tumors or pregnancy. But a little experience and patience will soon teach the physician that the tumor is simply abnormally thick, fat, belly walls.

Most of the pains arise around the stomach, *i.e.*, in the abdominal brain—the solar plexus. The pains that arise in the epigastric region are innumerable, indefinable, and baffle all systematic description. We must, however, have charity sufficient to allow the patient the doubt that such numberless disturbances are real. The "something moving in the stomach" may be abnormal peristalsis, induced by some diseased focus as in the globus hystericus. Whatever opinion is held by the physician a reasonable treatment should be introduced. Such patients have so much lack of confidence in themselves, their physician and their friends that they have not will power to keep up a systematic course of treatment. Hence they go around from one physician to another.

The duty of the physician is to locate the disease and remove it, or to attempt to restore order in a disordered nervous system which becomes unbalanced by reason of some irritation arising from atrophy, senility or inflammation. A thorough anatomic and physiologic knowledge of the sympathetic nervous system is required for intelligent practice in gynecology. The pathologic condition must be found in order to show skill in removing it. It must be remembered that a stormy puberty generally means a stormy menopause. The intimate and wide connection of the nervous system and genitals is phenomenal. The nervous connections of the genitals is profound and any genital trouble deeply impresses the whole being. It would not be strange, also, if one woman's uterus were found with vastly more nervous connections than another, or at least being much more sensitive than others. My experience in the dead-house and otherwise is that viscera vary much in size. In some a uterus is small, in others large without regard to the individual statural size.

Menstruation must be looked upon as arising and subsiding in the nervous system, especially in the sympathetic system. I would like to make a plea for more study of the nervous system, and particularly the visceral nervous system. From the lack of this knowledge physicians are mistaking nervous diseases for uterine diseases. A great evil is going on to-day in regard to misunderstanding, that a little nervousness does not always belong to the ovaries or uterus. The nervous system is a vast, finely ordered, nicely balanced machine which can be easily disordered without the least need of removing ovary, tube or uterus. Some general or local treatment may be amply sufficient. Too many laparotomies are being done to-day by unskilled men without proper facilities. Sweeping removal of organs is a backward step in surgery, and the general disapprobation of the leading gynecologic surgeons must cry it down. It must be insisted on that he who would work on the peritoneal cavity must be trained. Training and skill, coupled with a decent sense of right, will alone stand the test of time in any branch of surgery. The colleges must begin with chairs of visceral anatomy and abdominal experiments for small classes.

A pathologic state is one manifesting abnormal conditions, whether it be recognizable changes in structure, or simple deranged functions without perceptible disordered structure. There are reflex neuroses, by which I mean disturbances in distant parts produced by irritation of some sensory or motor-peripheral area. It is easy to note that a woman is irritable and nervous, without in the least being able to locate the pathology from which the disturbance originated. One of the most marked features of a woman in the menopause is the kind of nervous irritability. It may be easily observed, if one will note quite a number of women in the menopause, that they do not suffer from tumors and malignant diseases so much as they do from disturbance in the sympathetic system and cerebral-spinal axis. Nervous irritability characterizes four women out of five during the menopause. How does this come about? Two ideas explain the complicated but slow course of the disease, viz: Reflex irritation and malnutrition. Any one can easily see that the nervous system is out of balance in the menopause. The beginning and end of menstruation is in the sympathetic nerves. Puberty is heralded by ganglionic rhythm, and the menopause comes in at the cessation of the rhythm. The entrance and disappearance of menstruation is a nervous phenomenon. The genitals then become a point of new irritation as puberty begins, and the genitals are again the focus of irritation as the rhythm departs forever. Menstrual starting chafes the system profoundly, but its cessation irritates the system notably with its dying struggles. By the figure it is plain that any genital irritation can be easily carried to the abdominal brain where re-organization occurs. This newly organized force will go to every viscus in the sympathetic ellipse and damage the rhythm. Now the visceral rhythm is for the purpose of nutrition, and pursues its even tenor in a kind of orderly manner. But irritation from a focus never comes or goes by rule. It goes at all times and any time, while the viscera are performing their nutritive rhythm. The irritation from the diseased focus forces itself up the hypogastric plexus to the organizing center and is emitted to all viscera, in addition to the normal nutrition and rhythm and disorders natural to visceral rhythm.

A few weeks or months of irritation gradually produces deranged visceral rhythm and consequent indigestion. The addition of indigestion to a diseased visceral focus makes a double burden on the whole system. The nerves become more irritable. The focus of irritation (the genitals) and indigestion persist and soon bring on distinct malnutrition—another burden to the ganglionic system of nerves. All this continues until anemia arises—waste-laden blood. Now it is apparent to all when waste-laden blood bathes all the thousands of ganglia and nerve strands in the body that the patient may be nervous or irritable. She is neurotic. The sympathetic

ellipse is unbalanced and its centers are disordered. It is a slow process for the woman to pass from a single focus of visceral disease to a neurotic condition. The whole disturbance become intelligent by comprehension of the nervous system and a knowledge of the condition of the diseased genitals. The intelligent practitioner always examines the genitals in a diseased menopause. A stormy menopause means diseased genitals. It means a focus of pathology which is nearly always situated in the pelvis. The effects on individual viscera may be described by noting how the irritation can pass up the hypogastric plexus to the abdominal brain and being reorganized be emitted to the digestive tract. The irritation goes on day and night; when it reaches the digestive canal by way of the gastric, superior and inferior mesenteric plexuses it first affects Auerbach's ganglionic plexus of nerves which lie between the muscular layers of the gut wall. This simply disturbs peristalsis and induces perhaps some colic. But as the irritation passes on to Meissner's plexus it disorders secretion. Meissner's ganglia control secretion, and irritation of this plexus may induce excessive secretion (diarrhea), deficient secretion (constipation), or disproportionate secretion (fermentation). Thus the great assimilating laboratory of life is deranged. Digestive disorders are common in the menopause. Liver disturbances are not uncommon. The irritation passes through the abdominal brain to the liver, inducing excessive, deficient or disproportionate bile, glycogen and urea. The rhythm of the liver is deranged. Its rhythmical activity and quiet repose is continually disturbed by reflex irritation. It is easy to observe disease of the liver from the condition of the patient in menopause,—skin and bowel abnormalities. The route from the genitals to the heart is plain from the diagram. The irritation from the diseased genitals passes to the abdominal brain, thence up the splanchnics to the three cervical ganglia, whence the re-organized irritation passes to the heart over the three cardiac nerves. The result is that the heart goes rapidly or irregularly—it palpitates.

After nervous irritability the woman in menopause probably suffers most frequently from flushes and flashes, *i.e.*, irritation of the vasomotor and heat centers. Her skin glows with fresh red blood or burns prickling heat. This seems to me to be merely an unbalanced condition of the nervous system due to a disordered focus. The transmission of nervous energy goes pellmell, or in a tumultuous manner, over roads which are not accustomed to so much commerce and the centers are not able to orderly reorganize it. The circulation floods or depletes the vasomotor centers.

One may observe that some women enter puberty with many indescribable pains, and they continue to complain of peculiar abdominal pains during the reproductive period, and at menopause they simply become chronic grumblers and complain more and more bitterly. What must be said of such women? We must not consider them as fabricating untruths for a whole generation; we must attempt to study the ganglionic system of the sympathetic in order to unravel all the trouble. We may say that women with these abdominal pains are in a poor state of of nourishment. Debility characterizes the ganglionic disease, while irritability is the feature of cerebro-spinal axis troubles. Women with ganglionic disease are weak ill-nourished creatures, often unable to do a little housework. Can we not consider that such patients have hyperesthesia or anesthesia of the visceral ganglia? These ganglia are little brains, for they have all the elements of the cranial cerebrum,—nerve cells and process. In short every nerve cell is a unit in itself. It is an isolated anatomic unit, a neuron, a brain, a re-organizing center. The essential of the cell is the nucleus because it has the power of nutrition, hence reproduction. Hence each ganglia is a little brain, a re-organizing center. Now, a brain or ganglion cell receives sensation, sends out motion and controls nutrition. It reproduces itself, it controls secretion and lives in balanced relations with its environments. Can we not think that such patients have an over-sensitive or irritable abdominal brain? Their visceral nerve apparatus is abnormal, it is out of order. But this center holds in abeyance nerve energy and nerve force. It holds all the assimilating and circulatory laboratory in living tension. Such patients have not a perfect machine to work with. Such are generally congenital or made so by the acquisition of some profound function as menstruation. The female visceral nerves seem to be peculiarly liable to rapid derangement. Women faint frequently and slight occurrences disorder their viscera. The flying of a bird will make the heart palpitate. A sudden noise deranges respiration or circulation. A change of locality either puts in order or puts out of order the nervous system. The female nervous system is much more unstable than man's. And no doubt that this is the reason that so many physicians mistake nervous diseases for uterine diseases. Such physicians are either ignorant of the delicate nerve mechanism or are over-zealous operators.

The pathologic condition of the genital organs in the natural menopause is general atrophy. Absorption of fat and consequent shrinkage, lessened vascular supply and consequent smaller organs. It is a pure senile atrophy. The organs assumed action, served their purpose and subsided forever. Even in a natural menopause the distinct dying struggle may be expected in the hypogastric plexus. Puberty increases the volume of the organs while menopause lessens it. Puberty is the real birth while menopause is the real death, of the female genitals. The appearance of the individual organs at the menopause are peculiar. The vulva wrinkles and shrivels through the absorption of fat and other tissue. In dissecting senile genitals the pudendal sac of Bichât and Savage become more apparent than ever. One can push the index finger into it and the great labia will appear and feel very thin while the sac seems disproportionately large. The fat rounded form of youth obscures this peculiar pudendal sac even in dissecting. In old women the vulva flattens out and exposes the clitoris and small labia. The clitoris becomes smaller and blends with the surrounding parts so much that it is occasionally difficult to find its location. The vagina becomes smoother in its folds. It contracts in every direction and frequently it may seem to thicken but that is probably a delusion of blending with other tissue. The cervix gets smaller and may appear entirely absent, from the excessive shrinking and contracting of the vagina. The uterus becomes smaller and harder. It has a peculiar tough, elastic feeling from the atrophy of muscular

tissue. It assumes to some extent the form it had before puberty, except that the neck is more prominent before puberty. It straightens out. Its nerves and vessels shrink. The tubes are notably thinner and shorter. The circular muscular layers seem to suffer the most.

The ovaries shrink very much and resemble a peach-stone on the surface. In quite a number of old female cadavers I have found them the size of beans and in some it required considerable searching to find and recognize them. Then we found in the contracted and shrunken broad ligament the sheaths and nerves themselves atrophied.

In examining women with a stormy menopause it is not infrequent to observe subinvolution. While a pupil of Mr. Lawson Tait, several years ago, I gained some knowledge in regard to a disease of the vulva which may not infrequently be seen in women from 40 to 50, or about the menopause. It is a trouble that one would easily pronounce on a glance, eczema of the vulva. Mr. Tait remarked that it was due to a kind of climacteric diabetes; that it is a kind of eczema of the menopause. Dr. Martin, Mr. Tait's assistant, was very kind in displaying to me these unfortunate cases. The labia was swollen and edematous and the red flaming eczema extended far and wide beyond the vulva. The disease made the patient's life almost intolerable. Mr. Tait's treatment for such cases was a solution of hypophosphites of soda (an ounce to a pint of water). The solution should be applied every two to five hours as required, to destroy the germ which induced the itching. He then gave heavy doses of opium. Mr. Tait claims that there is a kind of diabetes mellitis during the menopause. Mr. Tait thinks it is a limited diabetes as they all finally recovered. The distress of the patient with this climacteric diabetes is due to the sugar urine on the vulva. Peculiar crusts form on the vulva, due to the multiplication of the vegetable germ known as *torula cerevisiæ*. The eczema due to this cause will spread over the buttocks, up over the abdomen and even down the thighs. In one case I saw the eczema extend so wide that the patient could walk only with difficulty. The hyposulphite of sodium arrests the formation of this germ. Mr. Tait would sometimes give as high as 1 grain of opium three times daily and then 2 grains at night. After a few months of such treatment the opium was lessened, and in from five to ten months such patients fairly recovered. They are liable to short relapses. Mr. Lecorche, of Paris, has also made researches independently of Mr. Tait and curiously enough they agree in many ways. Mr. Tait carried his views into more definite plans of treatment. This climacteric form of diabetes is then a disease which begins at the menstrual cessation and lasts a few years. Menstruation seems to give immunity to it. Nature appears to finally overcome it. If the hyposulphite of sodium is inefficient to arrest the trouble, on account of the fluid quickly running off the parts, an ointment of sulphur will remain on the vulva for hours. Any substance which will arrest the fermenting changes in sugar is an effective remedy. I have noted no special form of climacteric vaginitis, but one form is liable to arise which is due to laying bare of some peripheral nerves in the vaginal wall. The spots are red and most exquisitely tender; they occur mainly at the vulvar orifice and are very persistent. The treatment consists in applying cocain and then sufficient caustic or Paquelin to entirely destroy the exposed nerves. These neuromatic patches are apt to arise in women at other times also. In severe cases it is best to anesthetize the patient and destroy the exposed nerves widely by the Paquelin.

The especial diseases of the uterus in menopause which I have observed are endometritis and subinvolution. Chronic endometritis with an excoriating discharge I have not infrequently noted. The uterus is generally slightly large. The mouth is red, bleeds easily and out of it runs muco-purulent substance of varied color. The hot douche (10 quarts) twice daily and the additional use of glycerin tampons cures most cases. Occasionally a curetting is required, followed by the thorough application of 95 per cent. of carbolic acid on gauze wound on a sound. I apply the 95 per cent. carbolic acid to the endometrium three times, so that it will destroy the old inflamed endometrium and drain with a little rubber tube or pack in gauze and remove it in twenty-four to thirty-six hours. Fortunately the senile endometritis is generally cured with one curetting unlike the stubborn endometritis of youth. Mild forms of endometritis in the menopause I have frequently noted. The subinvolution or suspended involution is a much graver matter to health. It has had a more evil and wide effect on health and especially the nervous system. It consists essentially of a metritis, and so far as I can observe rests on an old endometritis. Whether Klob or Rokitansky is correct, I will not at present attempt to decide. Whether the hypertrophic uterus is due to excess of connective tissue or muscle, or whether it is due to a natural proportionate increase of both is still undecided. It may be often observed that such women have a lax pelvic floor in addition. So far as my limited experience goes, the tampon and douche are insufficient or are too slow for satisfactory effects. Thorough curetting is the best means at command, with the application of 95 per cent. of carbolic acid to the whole endometrium. The cure is slow at best but finally quite satisfactory. The pathology of the climacteric or senile endometritis must not be lost sight of. At first the leucorrhea is more abundant. It may be mucous, muco-purulent and finally pus. The explanation of the changes of the fluid secreted from the endometrium rests on the endometritic glands. At first the glands are able to be increased in their function; with time they atrophy, but the inflammation proceeds and finally only sero-purulent substance or chiefly pus from the glandular destruction and only now and then a glandular endometrium itself. The remnants only of the endometrium remain and these are involved in a state of low vitality. Low and wild forms of granulation are visible at the neck and can be scraped out of the uterus. Slow necrosis, local death, gradually proceeds until raw ulcerative surfaces are exposed and only pus will be secreted. The glands have disappeared. We must observe that cervical laceration frequently exists with this trouble. The reason such conditions do not heal well is because the blood supply and nerve supply to the uterus is now being cut off, curtailed, and it is imperfect so that nutrition is very deficient in the uterus. For thirty years the uterus has had high feeding from fresh blood and the fine control of a complicated nerve apparatus, but suddenly the high feeding is curtailed and the delicately balanced

nerve apparatus is impaired by the atrophy of the menopause. Hence low granulations, imperfect reproduction of cells, ulcerative surfaces may be expected. It must be remembered that there are other troubles than cancer in the uterus at the menopause. The essential feature of climacteric uterine trouble is imperfect nutrition. This will not astonish one so much after he has carefully examined and dissected or post-mortemed a dozen female cadavers above 50 years of age. In them he will note atrophy, shrinkage, contraction and pale white tissue.

The differential diagnosis between cancer and uterine trouble (endometritis) may be looked for in the case of cancer by infiltration, thickening and peculiar watery, saneous discharges. As regards ovarian tumors at the menopause they grow more rapidly. The vital power of the patient is at a lower ebb, and besides the nutrition of the ovary is degraded by curtailing its blood supply and atrophying its nerve supply.

It would appear that the branches of the hypogastric plexus which are sent to the bladder and rectum are not atrophied to the same degree as the branches sent to the genitals (uterus, tubes and ovaries). Yet in my post-mortems and dissections it appears to me that the vesical and rectal branches do atrophy sufficiently to be plain to the observer. The present idea of medicine is that there is an anatomic structure disordered somewhere to account for disease. A portion of a man only is diseased and pathologic anatomy could always indicate the origin had we sufficient acumen.

Now in the menopause the cerebro-spinal axis is disturbed through the means of the vasomotor nerves, and the circulation by some form of reflex neurosis. A woman's mind is often disturbed. She has lost her old will-power, her memory is impaired. She can not concentrate effort. She is liable to do damage from inability to control her own action. The law recognizes any deviation from rectitude during the menopause with leniency. The treatment of women during the menopause must be local, general and moral. The cog in the wheel which disturbs even physical existence must be remedied. General debility and irritability must be allayed by anodynes with both tonics and good nourishment. While the unhinged moral views must be removed by changing the life from the old ruts which caused it.

CONCLUSIONS.

1. The average menopause lasts two and one half years.

2. It comes on slowly as puberty does.

3. A stormy puberty means a stormy menopause generally.

4. The general rule is that an early puberty means a late menopause. In my opinion it simply means that early puberty and late menopause rest on a largely developed abdominal brain and hypogastric plexus. A vast nerve supply means also a large blood supply. Precocious puberty means well developed genitals and ganglionic nerves.

5. The disturbance at the beginning of puberty is profound, but since it is an active (depletive) physiologic process it quickly fits the growing and adaptive nervous system. But the menopause is a destructive process. It breaks up the harmony of the previous processes and unbalances the even distribution of nervous energy and circulation.

6. It is probable that every viscus receives an equal or greater shock at menopause than at puberty.

7. The changes at menopause consist in menstrual cessation, atrophy of the genitals and the hypogastric plexus.

8. Women do not suffer at the menopause so much from malignant diseases as they do from nervous troubles, neuralgias, mental deviations, disturbed visceral rhythm, disordered circulation, indigestion and above all neurosis.

9. The heat center (flashes), the vasomotor center (flushes) and the sweat center (perspiration) are the especial centers disturbed. Excessive, deficient or disproportionate blood supply characterizes the disturbed phenomena of these centers.

10. The etiology and pathology of the menopause lies in the sympathetic or ganglionic nervous system.

11. The systematic pathologic stages in menopause are: *a*, a focus of disease, or irritation (the genitals); *b*, indigestion; *c*, malnutrition; *d*, anemia; *e*, neurosis. It is a slow progressive process.

12. Atrophy is a disease just as much as hypertrophy or inflammation.

13. Chief among the actual diseases in the menopause is endometritis. The peculiar floodings doubtless depend on this inflammation.

14. The menopause is characterized by various discharges (mucous membrane), leucorrhea, bronchitis, hemorrhages from the bowels, epistaxis (skin) perspiration.

15. Circulatory, perspiratory and caloric changes are the common heritages of the menopause.

16. A characteristic phenomenon of the menopause is an unbalanced, unstable nervous system, cerebro-spinal (irritable); sympathetic (debility).

17. Debility characterizes the trouble in the ganglionic system, while irritability characterizes the cerebro-spinal axis.

18. The explanation of the various phenomena is only possible through the nervous and circulatory systems.

19. Excessive sexual desire at the menopause is indicative of disease.

20. In the menopause the nutrition is impaired as is shown by the occurrence of malignant disease in the sexual organs which are in a state of retrogression.

21. A chief feature characteristic of uterine disease is malnutrition from atrophy, curtailing blood supply suddenly, from the sudden degeneration of the genital nerve apparatus and consequent impaired control of tissue by a defective nourishment. Ulcerative surfaces, local death and purulent secretions arise from low granular cell formations.

22. In the menopause a disturbed point has arisen in the harmony of visceral rhythm. This pathologic focus must be looked on as the cause of the innumerable reflex neuroses at this time of life.

23. A reflex neurosis is a disturbance in distant organs caused by the irritation of a peripheral sensory or motor area.

Louisiana State Board of Medical Examiners.—Gov. Foster, of Louisiana, has announced the following appointments: Members of the Board of Medical Examiners on the part of the Louisiana State Medical Society: Drs. T. S. Kennedy, H. S. Cocram, T. Y. Aby, F. J. Kearney and A. F. Barrow; on the part of the Hahnemann State Medical Society: Drs. E. A. Murphy, O. J. Lopez, C. R. Mayer, Robert A. Bagley and J. W. Belden; Board of Control of Lepers Home: E. M. Hopper, Isidore Dyer, H. J. Schenck, Allen Jumel, A. A. Wood and C. J. Edwards.

BASSINI AND HALSTED OPERATIONS FOR INGUINAL HERNIA.

LIGATION OF FEMORAL FOR TRAUMATIC ANEURISM—MASTOID DISEASE—PELVIC ABSCESS ESCAPING THROUGH GREAT SACRO SCIATIC NOTCH —HEMOPHILITIC KNEE JOINT.

(Surgical notes Presbyterian Hospital, June 10, 1894.)

BY ARTHUR DEAN BEVAN, M.D.

SURGEON PRESBYTERIAN HOSPITAL; PROFESSOR ANATOMY, RUSH COLLEGE. CHICAGO, ILL.

Case 1.—The first case which I present to you is one of double inguinal hernia. This patient is 30 years of age, is a laborer; general health and history good. Has had this double rupture for twelve years. Examination demonstrates that they are oblique inguinal herniæ; from long existence the internal ring has been dragged down until it is opposite the external ring, thus simulating direct hernia. The term, straight hernia, is used to designate this condition. This man has continuously worn a truss, but even with the truss the condition has been a source of constant annoyance to him. My personal experience with the operation for radical cure of hernia, something more than thirty cases, has been so gratifying both with regard to permanence of cure and freedom from mortality that I feel warranted in advising this man to submit to operation.

On the right side I shall do a Bassini operation and on the left a Halsted, so that you may have an opportunity of comparing these two methods.

The Bassini.—I now make an incision through the integument and superficial fascia over the inguinal canal, about three inches in length, extending above the internal ring and down into the scrotum. This exposes the intercolumnar fascial covering of the hernia; this is the most superficial of the three coverings common to the cord and the hernial sac, the other two being the cremasteric fascia and the transversalis fascia. These three coverings must be divided before we can expose the peritoneal sac and separate it from the tissues of the cord. Many surgeons will tell you that it is difficult or impossible to distinguish these layers. I tell you that in almost all cases these coverings can be more readily demonstrated in an operation for radical cure of hernia than they can be on a cadaver in the dissecting room, and further that it is very desirable to be able to do this. It is only occasionally that we run across an old complicated hernia in which this is difficult or impossible. I shall give you a rule which will make it easy for you to identify these structures:

1. The intercolumnar fascia is exposed after the division of the skin and superficial fascia; it is the strongest, firmest, most fibrous covering of a hernia; this should be divided the entire length of the sac and as high up as the internal ring. The division of this layer exposes the second covering, the cremasteric fascia, which can be recognized from this fact and by the looped muscular fibers running through it. The division of this layer exposed the third, the transversalis fascia, which is recognized simply from its position. It has no distinguishing feature, beyond the fact that it is situated between the cremasteric fascia and the peritoneum.

It is at this point of the dissection that a layer of fascia sometimes presents itself which may confuse the inexperienced anatomist and operator, *i. e.*, the subperitoneal fatty layer which intervenes between the transversalis fascia and the peritoneum. This is often mistaken for the omentum. Its position, the ease with which it tears, its lack of large vessels and lack of peritoneal lustre enable the experienced operator to distinguish it from the omentum. I now expose the sac, separate it from the cord with fingers and forceps as high up as the internal ring. In this case the sac is very transparent. I can see that it contains neither omentum nor intestine and I shall not open it. I ligate the sac as high as possible and cut away the redundant portions. I now lift the spermatic cord out of its bed, separate the aponeurosis of the external oblique from the conjoined tendon with forceps and blunt dissector, free Poupart's ligament from the adjacent tissues, that is the superficial fascia and the cremasteric fascia. With silk sutures, seven in number, I close the entire inguinal canal by sewing together the transversalis fascia and conjoined tendon on the inner side to Poupart's ligament on the outer side. The spermatic cord is now laid over this closed canal and covered, by sewing over it the aponeurosis of the external oblique. The external incision is closed, without drainage, by silkworm gut sutures placed an inch apart, acting as tension sutures, and a fine continuous catgut suture placed an eighth of an inch from the margin of the skin and one-fourth of an inch apart.

We shall now do a Halsted on the other side. The external incision is the same as before, except that it is carried nearer the anterior superior spine of the ilium. I separate the sac as before, but instead of ligating it I cut it open with scissors parallel to the external incision; this incision extends above the internal ring and divides the neck of the sac. This exposes the general peritoneal cavity. The opening in the peritoneum is closed with mattress sutures and the redundant portion of sac cut away. The next step in the operation is the ligation of the great mass of the spermatic veins as high up as possible and at a second point below the external ring. The portion between the ligatures is cut away leaving the vas deferens and a few vessels. The canal is now closed with sutures which pass through the conjoined tendon, transversalis fascia and external oblique internally, and Poupart's ligament externally. The cord is then laid over this closed canal and the external incision closed as before. An aseptic compress is applied and retained by means of a double spica. One little point in the dressing of these cases is to sling the scrotum up over the abdomen with a silk or gauze handkerchief to prevent the gravitating into the loose tissues of the scrotum, of the blood and wound secretions, an accident which I have had occur several times when this precaution has been omitted. Subsequent history: Case ran a normal aseptic course with perfect closure of canals.

The second case operated upon was shown later at a meeting of the Chicago Medical Society:

Case 2.—A young man of 20; four weeks ago cut himself with a bit of glass over the inner and upper aspect of the left thigh at a point near the apex of Scarpa's triangle and in a line with the femoral artery. Profuse hemorrhage occurred but was readily controlled by bandage. He was taken to Cook County Hospital; the case treated as an incised wound; discharged at the end of two weeks with small suppurating sinus. A few days ago noticed an enlargement at the seat of injury and was brought to the Presbyterian Hospital. The condition, that of traumatic aneurism of femoral is evident. The operation which I shall do is the old operation of Antyllus, *i. e.*, cutting into the aneurism, turning out contents of sac, ligating both proximal and distal ends of vessel.

Cutting directly into the aneurism I find the sac composed of the deep fascia, sheath of femoral vessels and intermuscular septa. Turning out the blood clot I find a wound three-fourths of an inch in length in the anterior wall of the femoral artery; the vein is to the outer side, the internal saphenous nerve between the two vessels. The artery is ligated above and below the wound in vessel and vessel divided between the ligatures. The sac is very thin and does not demand removal. Subsequent history: No interference with circulation of limb. Patient discharged at end of two weeks cured.

Case 3.—The third case which I now present is one of mastoid disease. History: Measles, inflammation of middle ear, later involvement of the mastoid. This last occurred about a year ago. He now has a sinus about two inches behind the external auditory meatus; this suppurates freely at times, at times closes and then the pus escapes from the ear. Opening up the sinus an opening into the cranial cavity is found which is in the line of suture between the mastoid portion of the temporal and the occipital bone. It is evident that in this case the pus has worked its way from the mastoid process or middle ear into the inferior fossa at base of skull between the bone and dura, or else that we have a case of suppuration of the lateral sinus to deal with, and fortunately for the patient the suppuration has found a means of exit through the temporo-occipital suture; following this sinus with a chisel it is found to lead into the mastoid antrum; this is carefully scraped out, great care being necessary because of the proximity of the lateral sinus, if indeed the suppurating tract is not the lateral sinus itself.

Subsequent history: No uncomfortable symptoms; patient about on second day; still under observation.

Case 4.—This woman was confined five weeks ago; had septic inflammation following confinement. She presents herself to us with this huge swelling over the buttock covered evidently by the gluteus maximus muscle; temperature 103.5; fluctuation is distinctly felt. Upon opening the abscess I find that I can insert my index finger easily into the great sacro-sciatic notch; this is evidently a case of pelvic suppuration escaping through the great sacro sciatic notch

It is the second case of the kind which has come under my observation. Subsequent history: Disappearance of symptoms; five weeks after operation there is still a small discharging sinus.

Case 5.—The last case which I present to you is one of great interest. This man 40 years of age has been complaining for some weeks of rheumatic pains. He comes to us with this great swelling in and around the left knee joint; this swelling extends half way up the thigh and half way down the leg; the surface is covered with patches of ecchymosis. Examining the man's body I find multiple patches of ecchymosis on his arms and other thigh. He tells me that these ecchymosed patches occur from the slightest injury; that whenever he cuts himself he bleeds very profusely; that once he had a tooth extracted with alarming hemorrhage following. He does not know that any member of his family is similarly affected. This is evidently a case of hemophilia. The joint is a hemophilic knee joint. The treatment we shall advise is rest, compression with a flannel bandage, careful avoidance in the future of injury. These cases sometimes after repeated attacks have ankylosis result. The subsequent history: Patient was seen at end of two weeks; had improved greatly. He then passed out of observation.

GRAFTING FOR THE CURE OF EPITHELIOMA.

BY P. D. KEYSER, M.D.

PHILADELPHIA.

The removal of epithelioma by the knife or caustic has so far, been seldom, if ever a permanent cure, and as this disease appears mostly on the face especially near the eyes or mouth and in persons advancing in years, it becomes a source of distress and pain as well as a blemish, and in the removal by knife or caustic often a very defective scar is left with contractions of the lids and mouth which interfere with the natural and proper use of those parts. Transplanting from neighboring parts creates a greater defect, really defacing two parts; that where the epithelioma was, and that from which the piece of skin transplanted was taken. The drawing of the edges of the wound together where the disease is cut out causes very much contraction, interfering with the opening of the eyes or mouth. Even after such an operation, return of the disease occurs in a very short time, no doubt caused in very many cases by the not complete and thorough removal of the growth in the first place.

Knowing now from the latest studies that epithelioma is entirely a local disease of bacteriologic origin its thorough removal is necessary to insure a cure; and in doing this the gap in the skin must be filled up in some way, and lately grafting has been suggested instead of transplanting, so as to leave as little defect as possible; it is also claimed that the placing of healthy integument in the wound creates a healthy condition of all the surrounding parts and removes the tendency to a return of the disease.

To test the efficacy of this procedure I have during the past winter operated upon a very interesting case which is presented in this paper.

Mr. M., age 54, of Virginia, has been suffering with a slow growing epithelioma in the inner canthus of the right eye for over twelve years. It commenced in a small spot on the lower lid just below the line of the canaliculus. It gradually grew up towards the canthus, when four years ago he underwent an operation for its removal by the electric cautery. It was reported that it had all been removed; the wound, however, never healed properly, but instead, it seemed as if the growth was increased in vitality and started to grow rapidly, presenting the appearance of Fig. 1 as first seen by me.

Under an anesthetic I removed the disease completely with knife and scissors, and after stopping the hemorrhage, (which is always very free in such cases) by application of hot water sponges, I shaved a very thin graft from his upper arm, in size and shape so as to fit in freely and exactly the gap made by the removal of the diseased part.

Everything was done under thorough antiseptic preparation and influences. The solution of bichlorid of mercury being used 1 to 4000 on the eye and arm. The graft as soon as removed from the arm being

Fig. 1.

placed in a warm saturated solution of salt water, and then carefully transferred and fitted to the wound. The wound was covered with a piece of antiseptic oiled silk, over which were carefully laid and bound moist hot sublimate cloths and antiseptic cotton wool. As soon as the eye was bound up, applications of cloths steeped in hot water were constantly laid over the whole for an hour, and renewed after two hours. This being done to start up vitality in and around the graft. The latter applications I have always found a great adjuvant in the adherency and life of the graft in all such operations. After the

Fig. 2.

second day the oiled silk was removed and dry dressing applied for five days, after which the air was permitted to reach the graft through a thin dry gauze cloth laid over the part.

This operation has now been six months and the eye is as perfect as can be, there being no irritation or sign of the return of the growth.

Fig. 1. shows the case as first presented and Fig. 2 one month after the operation and as it is at present.

The success of this case recommends without doubt, this method of treatment of all cases of epithelioma on any part of the body if taken in time and before too large or deep and attacking vital parts.

A CASE OF ACUTE INFLAMMATION OF THE BRAIN IN A CHILD.

Read at a meeting of the Kalamazoo Academy of Medicine, May 15, 1894.

BY C. VAN ZWALUWENBURG, M.D.,
AND
I. H. NEFF, M.D.

In stating the following case, our attention is directed to the etiology and diagnosis of acute diseases of the brain; especially with reference to the effects of injuries; to the medico legal question involved; to the relation of infection to brain disease, and to the question of trephining after an injury.

The subject of the paper was a boy of Holland parentage, with an excellent family history, both as regards bodily and mental disease. He was a well developed child and the picture of health. No history of physical illness excepting a few attacks of gastro-intestinal trouble.

On March 20, 1894, he complained of headache and vomited considerably. The following day he fell, or rather slipped off the steps of a porch in a faint, as described by his parents. On this day or the day preceding, the exact date could not be determined, he was hit on the head by a stone thrown by a playmate. This produced a slight bruise on the right frontal prominence. He immediately complained of its causing him great pain. There was, however, but slight evidence of the injury and it was not thought to be serious. The headache persisted and increased in severity.

A week after the boy was injured I was called to see him. I found him sitting in a chair playing and talking with his playmates, but evidently suffering considerably; his head bent a little forward; his brows contracted; and his breathing irregular and shallow, each respiration being accompanied with a sigh. Every few minutes he would cry out, complaining of sharp pain in the head, indicating the position of the bruise as the seat of the pain. He maintained that any noise distressed him and apparently his pain was increased by this. At this time there were no symptoms of ocular trouble. After a few days he kept his eyes tightly closed, although not admitting that light caused any pain. However, when his eye-lids were forcibly opened, his actions indicated that light was distressing. Pulse 80, full and regular; temperature 99 F.; appetite capricious but no difficulty in swallowing; bowels obstinately constipated; vomiting had been repeated a few times but now, at the end of the first week, was absent. The left knee jerk could not be obtained and there was but little response on the right side; cutaneous reflexes normal. When asked to walk, he complied reluctantly. All his movements were slow, gait was very unsteady and he held out his hands as if afraid of falling. The walk was slightly ataxic, every step appeared to increase the pain in the head, his breathing was more "catchy," and all the symptoms were more exaggerated after any exertion. This was apparent when he was told to close his eyes when in an erect position. He then had extreme difficulty in maintaining his equilibrium and complained of acute pain. In the recumbent position there was marked abatement in the symptoms. The pupil of the right eye was at this time markedly dilated while the left was contracted. This peculiarity of the pupils was transient, and occurred when he was irritated or when there was any exaggeration in the symptoms. There was also slight ptosis of the right eye. Sensation was apparently perfect. The meningeal streak could easily be produced.

A diagnosis was made of meningitis and in consultation this was confirmed and was thought to be basal in situation.

The tongue now deviated distinctly to the left, there was lack of tonicity of the muscles of the left side, and movement was limited. During the next ten days, all these symptoms became increased and he continued to complain of intense pain in head, always indicating the frontal region as the seat of it. Delirium was present and became quite active. He talked incoherently on many subjects, was irritable and resistant. Ptosis of the right eye, dilatation of the right pupil, and the deviation of the tongue to the left side became very marked. The paralysis of the left side was now distinctly declared. Pulse varied but little, usually about 100, and was full, regular and about normal in character. He irritated the original bruise and there was now evidences of localized suppuration, although this was not connected in any way with the bone. Stupor was present and he could only be aroused with difficulty. Ophthalmostic examination disclosed intense neuro-retinitis in both eyes.[1] Breathing was irregular and assumed the character of the Cheyne-Stokes respiration. There was considerable emaciation. Constipation continued but there was no vomiting. The stuporous condition rapidly deepened and coma was declared with the usual symptoms. It was now extremely difficult to get response to any external stimulation, the temperature continued about 99 and pulse was not much accelerated. Cheyne-Stokes respiration was now present in its characteristic form.

After remaining in this condition for two or three days, he began to rally and a remission developed, lasting for five days. All the serious symptoms disappeared and pulse and respiration assumed the normal character. For the next four days there was but little change in his condition. The temperature would occasionally rise to 101, but was extremely irregular. He continued to complain of intense pain in the original seat, varying in intensity, but there was noticed a gradual decline in his general condition; he became quite anemic and emaciation developed.

On the thirtieth day of his illness, he had a severe chill which was repeated on each of the four succeeding days. At this time he coughed a great deal but no disease of the lungs could be determined, although a hacking cough was present, unaccompanied with expectoration. There was now present a slight exophthalmos of the right eye—the day following the lids of both eyes were edematous and there was marked chemosis of both conjunctivæ. The protrusion of the eyeballs continued for about a week and then entirely disappeared. Although the paralysis of the left side was quite well declared, he would at times apparently recover power but never regained the normal motion either in the hand or foot.

In the fifth week of his illness, an exacerbation in the symptoms was pronounced but, owing to the comatose condition, they were not well declared. He rapidly lost strength, the original symptoms became prominent, and he died from cardiac asthenia.

Autopsy, twenty-six hours after death. Body emaciated; rigor mortis well developed; post-mortem lividity in usual situation; pupils dilated Permission was only granted to examine the brain. Scalp thin and anemic; calvarium thin; no evidence of displacement, disease or fracture of bones of skull. Dura mater normal, except in region of right occipital convolutions, where there was adhesion of the membrane to the bone and marked bulging in this region—also pronounced asymmetry. Gentle traction was unavoidably made, a rupture occurred and there was a flow of fetid pus to the extent of three ounces, resulting from the solution of continuity of convolutions in this region. The brain was then lifted from its situation. Externally there was no abnormality except in region indicated above. No disease of the sinuses could be determined. The lesion on convexity occupied an area of two to three inches in circumference and was localized, namely: At the posterior part of the first temporal sphenoidal convolution. There was marked thinning and softening of gray matter in this region and an external communication, as above mentioned, produced by manipulation.

The brain was thoroughly hardened and transverse sections were made. Nothing unusual except indications of anemia was noticed anterior to the Rolandic convolutions. The right hemisphere, posterior to the Rolandic fissure, was extensively diseased and gave evidences of intense suppurative inflammation involving the entire white matter posterior to the fissure noted above. The lateral ventrical on same side was dilated and contained a small amount of pus extending to the opposite ventrical. The white matter of left hemisphere in corresponding region was considerably disintegrated and pus was irregularly distributed, but the inflammation was not so well declared. An examination of the base showed no abnormality. Pons, cerebellum, medulla and upper portion of the spinal cord appeared normal.

The difficulty of diagnosing acute brain disease in children is well illustrated in the description of the above case. The multiplicity of the symptoms, their transitory character, and the passive resistance offered by patients in this condition, often renders an accurate diagnosis impossible. In the case reported there was never any symptoms which would accurately localize the disease, and for this reason an operation was not deemed justifiable. The treatment was entirely palliative. The prognosis was thought to be grave during the entire course of the malady.

[1] Dr. O. A. LaCrone.

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SATURDAY, SEPTEMBER 1, 1894.

THE HODGKINS FUND PRIZE.

In October, 1891, THOMAS GEORGE HODGKINS, of New York, made a donation of $200,000 to the Smithsonian Institution, the income from a part of which was to be devoted to "the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man." The atmosphere in its hygienic relations, its influence upon the public health, and upon individual health, comfort and well being was MR. HODGKINS' hobby; he believed that good air was of prime importance to good health and thence to good morals. The study became his life work, and before he died last year he had the satisfaction of approving the initiatory steps taken in administering the Hodgkins Fund by the Smithsonian Institution. These steps consisted in establishing a number of prizes, the most important of which is one of $10,000 for any new and important discovery in regard to the nature and properties of atmospheric air—these properties to be considered not alone in their bearing upon meteorology or other branch of physical knowledge, but also in relation to biology and especially to hygiene and public health.

At the recent meeting of the British Association for the Advancement of Science an announcement was made which is now construed as a claim for this prize. LORD RAYLEIGH, Secretary of the Royal Society, and PROFESSOR RAMSEY, F. R. S., claim to have separated a hitherto unidentified gas, probably elementary, from the nitrogen of the air. They obtained this gas by passing sparks from a Rhumkorff coil through a vessel full of air; after the resulting oxides of nitrogen are absorbed in caustic potash, a residue is left which is neither oxygen or nitrogen. It is believed by the discoverers that this is the *tertium quid* needed to explain the discrepancy, long recognized in the atomic weight of nitrogen obtained from the air and of that obtained from other sources—the density of the former being about one-half per cent. higher; no satisfactory explanation has ever been offered to account for this difference, but the discovery of another gas, previously unknown, may solve the mystery. This new gas answers to no chemical test yet applied, but possesses a very distinctive spectrum, consisting of a single blue line, much more intense than the line of the same wavelength in the nitrogen spectrum; it is present in the air to the extent of only 1 per cent., and up to the date of the announcement only a small quantity—about 100 cubic centimeters had been obtained.

Since the receipt of the information of the discovery in this country it has aroused considerable skepticism. The general ground for disbelief seeming to be that the many experiments in atmospheric research which have been made within the past few years would certainly have revealed, if not the new element itself, at least some trace by means of which its existence might have been previously discovered. Other critics point to the sensational conditions under which the discovery was exploited—*i. e.*, at a stated meeting of the foremost scientists of Great Britain, without previous intimation of an event of such interest to scientists; while the *farceurs* suggest that English chemists have the advantage of American in the possession of an atmosphere about London in which anything might be found.

So far as this skepticism is seriously and honestly entertained, it might be answered—as to the objection that the new element had hitherto eluded detection—by referring to the recent discoveries of gallium, germanium and scandium, elements whose existence PROFESSOR MANDELÉEFF had predicated upon his law of the grouping of the elements into families whose members resemble each other in weight, volume, heat and laws of combination, and in which plan of families there are blanks because all the elements thus defined have not yet been discovered; there are three such blanks between the atomic weights of 19 and 23, fluorine and sodium, and it is surmised that RAYLEIGH and RAMSEY'S new element may fill one of them.

If it be urged that the discovery of an element forming only 1 per cent. of the atmosphere is of little practical importance it may be well to recall FARADAY'S Yankee-like reply to the Gradgrind visitor to his laboratory, who queried as to the use of some of his experiments: "Of what use is a baby?"

MEDICAL TRAINING.

Questions of medical education that occupy so much attention in journals and medical meetings, are often treated from a very narrow and erroneous point of view. The school that teaches such a great variety of subjects, with enormous faculties,

and almost wonderful system of division of topics, may fail to graduate successful men. Its students may have what PROF. GROSS used to designate as "photographic memories, and microscopic brains," and be storehouses of medical matters, and yet pass through a long life without ever contributing a single fact to science. Many teachers and even writers use the term medical education, as if it was something complete and finished. Diplomas are considered as evidences of this, and are offered as guarantees of scientific skill.

These are sad delusions; a medical education is never finished and no one can be called educated in any true sense. The true aim of medical schools is to train men to observe and think for themselves, not to load them with facts and theories. The facts of anatomy, physiology and chemistry, are of no value except as they teach one to observe and accurately note the relations to other things. The use of the microscope requires a constant observation and comparison of things, to eliminate sources of error, and to arrive at conclusions which appear to be accurate. To-morrow observations may bring new facts and new differences that were not seen yesterday. To be proficient here requires long practical training of all our powers of observation and comparison. The memorizing of the facts which are seen by the microscope would never make a practical microscopist. The same with anatomy; the facts must be sought for, and examined, and compared. One of the obvious reasons for the failures of medical men is this want of practical training. The assumption of truths without personal examination. and the inability and want of training to examine independently the various questions which come up in every day life are apparent to all. Many medical men turn to text-books and journals for help, where the facts could be ascertained by accurate study and comparison.

The college that will train students to be explorers, and how to examine and accurately study the various phenomena of health and disease is the ideal one. The teacher who can inspire the student to be a discoverer, ever on the alert for new facts and new truths, and new conceptions of old truths, who is never learned, but always learning is the ideal scientist. The blunders, inaccuracies, the dogmatism and errors of statement seen in medical journalism alone, are a sad reflection on the failures of colleges to graduate trained men. Even text-books are examples of bad training, in the use of language and statistics that are open to a great variety of meanings and widely different conclusions. The details of treatment and operations often give evidence of this looseness of expression and failure of accuracy in both comparison and observation. On the other hand, the most minute differences of symptoms and diseased states are often given, plainly indicating imagination more clearly than accurate observation. The explorer in the Arctic regions describes the appearance of the country as he sees it, never assuming that his view comprises the entire field, or that some other observer may not point out many new facts which have escaped his attention. In like manner the trained physician describes the facts as they appear to him, with the reasons, fully realizing that other observers may reach different and more accurate conclusions.

Now that medical teaching has been placed on a more uniform and broader scale, the profession should require something more than recitations and memorizing of facts. The student should train his senses to observe and his brain to constantly compare, and understand not only the fact, but its relations to other facts; and this training must continue through a long lifetime. No college can educate a man in the true sense; all they can do is to prepare him to use his powers of observation and reason, and to be accurate and true. When the student realizes his limitations of sense and reason, and the personal equation of error that is liable to complicate his observations, he becomes a scientist in the highest meaning of that word, and his life work is a search for truth, that is constantly being verified by other observers. The medical fads and theories that for a time attract attention, then die away, would not be possible if medical men were accurately trained observers. New operations, new drugs, new methods of treatment, that after a short period of popularity are forgotten are the result of inaccurate observations and faulty reasoning. If they had been truths of science they would have lived, and no opposition or neglect could have killed them.

An English college has recently adopted a plan requiring all senior students to spend the last year exclusively observing and writing up cases, the notes of which are corrected by the teachers. In this the senses and reason are trained to observe and compare the relation of facts. Often the difference between a successful quack and a physician, is that the former is a closer observer and reasoner. If the physician had the powers of observation of the quack, the latter would have no place in his neighborhood. There is clearly a very wide field here for change and improvement. Our excellent colleges have not covered the field in their elaborate curriculums; the subjects left out are still extensive and very important. The matter taught is open to change and wide variation, but the manner of teaching concerns the failure and success of every student. No gathering of medical knowledge can make a medical man; he must be a student, an explorer, who will observe and examine for himself continuously through all his life. Such men are with us, but we want more of them.

DISTRACTION IN THE TREATMENT OF HIP DISEASE.

The subject of traction in the treatment of hip disease has again been studied by BRADFORD and LOVETT (*New York Medical Journal*, Aug. 4, 1894). Seven healthy hip joints in children between the age of 6 and 16 years were tested with a traction force of ten and twenty pounds; eighteen experiments were made. In three instances these resulted in one-eighth inch shortening; in five there was no change; and in the remaining ten there was lengthening from one-eighth to one-fourth inch. From this it would appear that in the majority of instances traction of ten to twenty pounds will distract the healthy hip joint in children from one-eighth to one-fourth inch; but that in a certain number of cases this traction force appears to have no influence, and in a few instances it stimulates muscular contraction to an extent sufficient to actually shorten the limb one-eighth inch.

Twenty-four experiments were made upon diseased hip joints in twelve children between the ages of 4½ and 16 years. A traction force of ten and twenty pounds was applied. In no instance was there shortening; in five there was no change; and in the remaining nineteen there was lengthening of one-eighth to three-eighths inch. In one patient the tests at ten and twenty pounds were not verified on account of the pain produced. The five instances where there was no change were to the ten-pound force in four cases, and the twenty-pound force in a boy 16 years old. From this it appears that in the vast majority of instances a traction force of ten to twenty pounds distracts a diseased hip joint from one-eighth to three-eighths inch.

In all these tests the patient was recumbent; no tests were made with the patient walking; no tests were made to show how long these patients would tolerate a traction force sufficient to distract; and none to show how long the adhesive plasters applied to the limb would remain in place, or how long the skin would remain sound under the adhesive plasters. Thirteen cases are reported in detail where good results were obtained by the use of traction in their treatment, but in none of these is there any evidence that the joints were distracted; nor is it shown how many pounds traction were employed, nor whether the traction was maintained without interruption; in a word, the thirteen cases reported have no connection whatever with the experiments in distraction, although they appear to have, being placed between the records of experiments with distraction and the conclusions drawn therefrom.

It appears that diseased acetabuli heal more quickly after excision of the head of the femur, and that those parts of the acetabulum upon which the femoral head does not impinge show less distraction than other parts; also that these cases treated by traction have less displacement upward of the greater trochanter than those not treated at all. But these observations appear to us to have no bearing upon the question of distraction in the treatment of diseased joints. The curative effect of surgical procedures upon tubercular tissues, of rest in bed, and of immobilization of the diseased joint are not taken into account in considering the results in the cases treated.

There is no question that certain joints, the metacarpo-phalangeal for instance, can be distracted, but there is still some question in the minds of some orthopedic surgeons whether the elongation of the limb obtained in these experiments is due to the separation of one articular surface from the other or the sliding of one surface upon the other. It would therefore have rendered the argument more conclusive had the experiments been made upon a joint where there was no doubt about the possibility of actual distraction.

These experiments in distraction are interesting in so far as they have bearing upon the anatomic conditions, but they should not be confused with treatment by traction splint or any other form of traction, for no one has yet even claimed to maintain the hip joint in the condition of distraction during any considerable period of time.

MASSAGE IN SURGERY.

The value of massage in certain surgical cases seems but imperfectly understood, and yet there are few expedients in surgical therapeutics that have a better defined place. In sprains, contusions and tendon adhesions, massage is nearly always indicated. In sprains after the primary swelling has subsided, or even at its maximum, no special treatment seems to unload the vessels more promptly than gentle massage; under this practice the plastic obstruction of the lymphatics gives way, absorption of the exudate commences, and venous engorgement disappears.

In the after treatment of dislocations, whenever passive motion is indicated, we find massage of great utility, and it is absolutely indispensable in the treatment of fractures of the lower end of the radius and of the leg. When these fractures take place in aged persons, especially in old women who are thin, there is an uncomfortable tendency toward contraction of the flexor tendons and adhesion of flexor sheaths. The statement has been made by some surgeons who are not very careful of their expressions, that well adjusted fractures are not liable to contract adhesions. This is certainly an error, for there are many perfectly adjusted fractures where, owing to exuberant callus, or other mechanical irritation a copious exudate is thrown out from the tendon sheaths; this exudate left to itself causes per-

manent thickening by consolidation of the exudate. Proper massage may prevent this by favoring absorption.

Contraction of tendons, that *béte noir* of the aged, may follow a fracture without a great amount of exudate, and this too requires massage for its prevention.

We have mentioned massage in general terms; it should be applied in a proper way to be of the greatest service. Mere rubbing will not answer; the tendons separately must each be gently manipulated from its insertion to the belly of the muscle, by the thumb and finger of the masseur, and gentle friction applied to the whole limb. All joints in the vicinity must be alternately flexed and extended. Should much swelling follow these movements, the treatment should be suspended for a day or two; although usually in the hands of a careful masseur the daily application of massage is better than to perform it on alternate days, but there are cases that will not bear it more frequently.

It is in such cases that the trained masseur may show his skill and ability to the greatest advantage. The true masseur should combine great muscular power with extreme delicacy of touch, therefore every man can not become a good masseur; thus, while much may be learned by practice, yet the fact remains that the best manipulators have natural qualifications for the absence of which, no training can compensate.

"SMALLPOX STILL LINGERS."

If there were no higher motive, the *argumentum ad pecuniam* alone should impel every member of the profession to do all that in him lies to delete smallpox from the list of current diseases. There's "nothing in it," as a source of professional income; one variolous patient will ruin, for the time being, a good paying general practice. An epidemic of the disease seriously impairs the commercial prosperity of a community, and the reflex is seen in the returns of the bill collector. Aside from this, the disease is a loathsome one to treat, and even the best results of treatment are too often unsightly and unsatisfactory.

For these, among other reasons, it is cause for regret that "smallpox still lingers" in many parts of the country to such an extent as to excite serious forebodings for the approaching cold weather. Besides its existence at many smaller places, the situation is especially grave in Newark, N. J., in Detroit, Milwaukee and Chicago; in some the health departments are demoralized; in others efforts at prevention and suppression are met with opposition in which, by turns, appeals to the courts and to arms, to injunction and riots, are resorted to; in all there is a dangerous ignorance or suppression of facts, either by officers, on the one hand, who report that "smallpox has practically disappeared," or that "the disease is well under control," or, on the other hand, by the "antis" who oppose vaccination, conceal cases, resist restrictive measures and in other ways assist in the spread of the disease.

Concerted action by the profession—as well by public expressions of its organized bodies as by individual effort with the families of each member's *clientéle*—would do much to remedy this threatening state of affairs. The community still needs to be educated in the protective virtue of vaccination, in the necessity for inspection and for the fullest publicity, not alone of the whereabouts of actual cases but of those who have been exposed and remain unprotected. Health officers need the moral support which only the profession can secure for them; and municipal authorities in too many instances require to be told their duties in the premises with all the force and impressiveness which the professional dictum may command.

Such concerted action taken now, while there is yet time to "stamp out" existing contagion and to perfect the work already done in the line of securing vaccinal protection, should abolish the stereotyped phrase—"smallpox still lingers"—and enable the country to face the coming winter without apprehension of another smallpox epidemic.

CORRESPONDENCE.

Cataract Extraction as an Office Operation.

CHARLESTON, S. C., August, 1894.

To the Editor:—I have read with surprise three communications on this subject in the August number of the *Ophthalmic Record*, by Drs. T.E. Murrell, W. Cheatam and Robert Fields LeMond. Dr. Murrell's advocacy of this proceeding has been well known for several years, and I did not for a moment think that any one else would try to usurp his position as prime mover or would even wish to share such an honor(?) with him. Dr. Murrell is a progressive and intelligent ophthalmologist and as every man is apt to have a hobby or to be peculiar in certain views, I think but little attention was paid to this vagary of advocating the removal of cataract in his office or at a dispensary, and sending a patient to his home immediately afterward; but all thought that sooner or later he would sober down and tread the well-beaten path that all conservative surgeons desire to follow and which leads to the best interests of the patient. But poisonous germs will increase when planted in fertile soil, and now we see two more advocates of the proceeding, and there is no telling how many may spring up and how many eyes may be lost before these gentlemen realize that the proceeding is not an advance in eye surgery, is not scientific treatment, is not difficult in technique, does not conserve the best interests of the patient, is not necessary, but is rash—and therefore shows poor judgment—may cause loss of vision, and therefore should receive from every conscientious ophthalmic surgeon unqualified condemnation.

I ask if any ophthalmic surgeon thinks that he has honestly done his best for his patient when he extracts cataract in his office or dispensary, and immediately afterward allows the patient to walk or ride several blocks to his

ome" If not, there are but two reasons for the proceeding nd they do not concern the patient. They are: 1, it is more onvenient and time saving for the surgeon; and 2, it gives im the reputation of being a bold and skilful operator who orns the conservatism of the old fogies. I was taught, and elieve, that the chief object of the physician is to heal the ck by the safest, surest and most available means at his com- and, and that in accomplishing this he gains the respect nd confidence of the world. Every one must admire the bold nd skilful surgeon who in an emergency does not hesitate o make use of any means that may save his patient, but he extraction of cataract is not an emergency operation nd delay does not cause loss of the eye. No one will con- nd that it is as safe for a patient after removal of cataract o walk, or ride to his home as it is to remain quietly in bed, r seated in a chair. Would any of the gentlemen named ake this risk with a patient from whom they expected to eceive a fee of $500 or $1,000? Would they permit the ope- ation to be performed upon their own eyes as they advise for thers? It may be said that a physician's time is too precious or him to waste it in running around after the poor—then he hould give up such practice to those who will and can ttend to it. I contend that if but *one* eye out of a thousand s lost by accident occurring on the way home after cataract peration performed in an office, or dispensary, it is suffi- ient to condemn the practice and to render the operator iable to suit for mal-practice. If it were *necessary* to emove cataract in our offices, or at a dispensary, I should ffer no protest. CHARLES W. KOLLOCK, M.D.

ASSOCIATION NEWS.

American Medical Association.

Section on Ophthalmology.

Forty-fifth Annual Meeting, held at San Francisco, Cal., June 5–8, 1894.

FIRST REGULAR SESSION, TUESDAY AFTERNOON, JUNE 5.

The Section was called to order at 3 P.M.

Address by the Chairman, DR. ALBERT R. BAKER, of Cleveland, Ohio.

The first paper read was by DR. F. B. EATON, of Portland, Oregon, on "The Physiology of Certain Oculo-motor Phenomena, with respect to Some Recent Theories of Asthenopia."

Discussed by Drs. Edw. Jackson, Geo. H. Price, H. V. Würdemann, W. F. Southard, Kaspar Pischl, H. Bert Ellis and discussion closed by Dr. Eaton. Drs. Hobby and Lydston were absent and Dr. Voorhees unavoidably prevented from preparing his paper.

The general meeting of the ASSOCIATION having directed the Sections to appoint alternates in place of absent members of Executive Committees, the chair appointed Drs. Edw. Jackson, W. E. Briggs and H. V. Würdemann. The same committee to act as nominating committee for the Section. As Dr. Jackson could not serve owing to other duties, Dr. A. R. Baker was by vote appointed Chairman of the Committee. Adjourned.

MORNING SESSION.—JUNE 6.

Called to order at 9:30 A.M. Minutes of the previous meeting were read and approved.

The first order was the reading of the report of the committee appointed in 1893, to report upon "The Value of Objective Tests for the Determination of Ametropia—Ophthalmoscopy, Ophthalmometry and Skiascopy." Committee: Dr. Edw. Jackson, Chairman, Philadelphia, Pa.; S. M. Burnett, Washington, D. C.; H. V. Würdemann, Milwaukee, Wis.; J. L. Thompson, Indianapolis, Ind.

As other papers were to be read, bearing upon the same subject, discussion was deferred until the same were read.

DR. B. A. RANDALL being unavoidably absent and having sent his paper to the Secretary, the latter on vote of the Section was directed to read Dr. Randall's paper on "The Value of Retinoscopy as a Crucial Test in Measuring Errors of Refraction."

The next paper on "Status of Skiascopy" was read by DR. H. V. WÜRDEMANN, of Milwaukee, Wis.

DR. JACKSON, of Philadelphia, then read a paper on "The Visual Zone of the Dioptric Media and its Study by Skiascopy."

The report and papers read were then discussed by Drs. F. B. Eaton, of Portland, Oregon; S. B. Davis, Stockton, Cal.; A. C. Simonton, San José, Cal.; R. D. Gibson, Youngstown, Ohio; Fred Baker, San Diego, Cal.; W. E. Briggs, Sacramento, Cal.; A. R. Baker, Cleveland, Ohio; L. R. Ryan, Galesburg, Ill.; H. V. Würdemann, Milwaukee, Wis.; Lewis H. Taylor, Wilkesbarre, Pa.; A. J. Erwin, Mansfield, Ohio; and discussion closed by Dr. Jackson.

The Secretary read a communication from the Secretary of the ASSOCIATION, calling attention to the fact that all papers read before the Sections and to be referred for publication, with all plates, etc., are regarded as the exclusive property of the ASSOCIATION.

On motion the afternoon session was fixed at 3 P.M., instead of 2 P.M., in order to allow members to attend the general session of the ASSOCIATION.

WEDNESDAY, JUNE 6.—AFTERNOON SESSION.

The report of the Nominating Committee not being ready, Dr. A. H. Voorhees, San Francisco, presented a patient on whom he had performed double cataract simple extraction; also instruments, cataract knife with double cutting edge and bulb apparatus for irrigating the anterior chamber.

The Nominating Committee reported as follows: President, Dr. Edward Jackson, of Philadelphia, and for Secretary Dr. H. V. Würdemann, of Milwaukee.

The Secretary was directed to cast the ballot in favor of the above named and they were declared unanimously elected.

DR. S. D. RISLEY listed for the next paper being absent, DR. H. M. STARKEY, of Chicago, followed with a paper entitled, "Are Low Degree Lenses of Purely Mythical Value?"

DR. C. M. HOBBY'S paper on "Asthenopia" was here presented and the Secretary by vote of the Section directed to read the same.

Discussion on the two papers followed, participated in by Drs. H. Isaac Jones, San Francisco; H. B. Ellis, Los Angeles; A. C. Simonton, San José; H. B. Young, Burlington, Iowa; Fred Baker, San Diego, Cal.; L. R. Ryan, Galesburg, Ill.; Geo. H. Price, Nashville, Tenn.; S. B. Davis, Stockton, Cal., and closed by Dr. Starkey.

The next paper, "Cyclophoria; Its Detection and Treatment," was read by DR. GEO. H. PRICE, Nashville, Tenn.

Discussion by Drs. F. B. Eaton, Portland, Oregon; A. J. Erwin, Mansfield, Ohio; A. C. Simonton, San Diego; and closed by Dr. Price. The time for adjournment having arrived, the chairman announced that the next paper, "School Children's Eyes," would be deferred until the first order of business on Thursday morning. Adjourned.

MORNING SESSION—JUNE 7.

Called to order at 9:30 A.M. Dr. Baker, Chairman, being detained by a meeting of the Medical College Association, Dr. Edward Jackson, of Philadelphia, was appointed chairman *pro tem.* Minutes of June 6 were read and approved.

DR. W. F. SOUTHARD, of San Francisco, then read a paper on "School Children's Eyes; A Plea for the Examination of Every Child's Eyes when Commencing to Attend School."

As DR. KASPAR PISCHL's paper was upon a similar subject, it was here called for, but as his charts had not arrived it was deferred.

Discussion upon Dr. Southard's paper followed, participated in by Drs. R. N. Miller, Los Angeles; L. R. Ryan, Galesburg, Ill.; F. B. Eaton, Portland, Oregon; H. M. Starkey, Chicago, Ill.; H. B. Young, Burlington, Iowa; Edward Jackson, Philadelphia, and closed by Dr. Southard.

DR. W. E. BRIGGS, of Sacramento, Cal., then read two papers: 1. "Sub-conjunctival Injections in the Treatment of Eye Diseases." 2. Optico-Ciliary Neurotomy, with Exhibition of Scissors."

Discussion by Drs. Edward Jackson and Kaspar Pischl, and closed by Dr. Briggs.

The hour fixed for special order of business in the general session of the ASSOCIATION having arrived, the remaining papers were deferred and the Section adjourned to meet at 2 P.M.

AFTERNOON SESSION—JUNE 7.

Section called to order at 2:40 P.M. Dr. Baker in the chair.

The first paper was read by DR. X. C. SCOTT, of Cleveland, Ohio, on "Treatment of Purulent Ophthalmia."

Discussed by Drs. A. Barkan, San Francisco, Cal.; H. M. Starkey, Chicago, Ill.; Kaspar Pischl, San Francisco; H. V. Würdemann, Milwaukee, Wis.; J. Dennis Arnold, and discussion closed by Dr. Scott.

The next paper was read by DR. LEWIS H. TAYLOR, of Wilkes-Barre, Pa., on "Conservative Treatment of Wounds of the Eye-ball," and discussed by Drs. A. R. Baker, Cleveland, Ohio; W. E. Briggs, Sacramento, Cal.; X. C. Scott, Cleveland; H. H. Weer, Bluffton, Ind.; L. R. Ryan, Galesburg, Ill., and closed by Dr. Taylor.

DR. LE MOND being absent, the next paper, "Some Unusual Reflexes from Pathologic Conditions," by DR. GEO. H. POWERS, San Francisco, was read by title and referred to Committee on Publication.

The same with paper by DR. A. G. HOBBS, of Atlanta, Ga., on "The Treatment of Pterygia with the Galvano-Cautery," the paper having been sent to the Chairman, and Dr. Hobbs detained on account of illness in his family.

DR. KASPAR PISCHL read the next paper on "Report of the Examination of the Eyes of 1,900 Children of the Public Schools of San Francisco."

Discussed by Drs. S. B. Davis, H. H. Weer, H. B. Young, W. F. Southard, H. L. Burrell and closed by Dr. Pischl.

"Fractures of the Orbit," by DR. J. F. FULTON, of St. Paul, was read by title and referred for publication, as the writer was engaged as Secretary of the Otological Section.

DR. H. ISAAC JONES, of San Francisco, then read a paper entitled, "Eye Symptoms in Locomotor Ataxia—With Presentation of a Patient."

Discussion by Dr. H. B. Young and closed by Dr. Jones.

A paper by DR. EDWARD J. BROWN, of Minneapolis, on "A New and Convenient Arrangement of Rotary Prisms," was read by title, as was also one by DR. W. E. HOPKINS, of San Francisco, on "Deposit of Cholesterin Within the Anterior Chamber from Non-Traumatic Causes."

DR. W. T. MONTGOMERY'S paper on "Progressive Hypermetropic Astigmatism," was called for, but as the writer was not present this ended the reading of formal papers.

Miscellaneous business being in order, Dr. H. B. Young referred to legislation on prevention of blindness, and Dr. Southard asked the coöperation of all workers in ophthalmology in securing legislation in this direction.

Dr. H. M. Starkey presented the following, seconded by Dr. Southard, which was carried:

Resolved, "That it is the sense of the Section on Ophthalmology of the AMERICAN MEDICAL ASSOCIATION that the eyes of all children should be carefully tested by competent persons before entering upon school life."

Discussed by Dr. Ellis and Simonton.

The Executive Committee report as the topic for special discussion at next year's meeting, "The Examination and Care of the Eyes during School Life—Instruction of Teachers and School Authorities and Legal Provisions," and appointed the following Committee to prepare the report:

Drs. B. A. Randall, Philadelphia, Chairman; W. F. Southard, San Francisco, Cal.; H. B. Young, Burlington, Iowa; A. R. Baker, Cleveland, Ohio; George H. Price, Nashville, Tenn.

The Secretary read a communication from Dr. Savage, of Nashville, asking the Section to invite the International Ophthalmological Congress to hold its next session in this country, and suggested the appointment of a delegate or delegates to attend the meeting of the Congress to be held in Edinburgh in August next.

It was, however, the sense of the Section that as the Congress was not a representative body we could not properly send delegates to the same.

It was also deemed inadvisable for the Section to extend an invitation to the Congress to hold its next meeting in this country.

Dr. R. D. Gibson moved that the Section extend to its retiring officers a hearty vote of thanks for their labors in securing and carrying out the excellent program of the sessions. Carried by a rising vote.

The meeting for 1894 was then adjourned.

The Executive Committee of the Section on Ophthalmology for the ensuing year, according to the resolution adopted in 1891, will consist of Dr. J. L. Thompson, 20 West Ohio Street, Indianapolis, Ind.; Dr. S. D. Risley, 1722 Walnut Street, Philadelphia, Pa., and Dr. Albert R. Baker, 122 Euclid Avenue, Cleveland, Ohio.

A. R. BAKER, Chairman.
LEWIS H. TAYLOR, Secretary.

To Medical Societies:

OFFICE OF THE PERMANENT SECRETARY,
1400 PINE STREET, PHILADELPHIA, PA.

The Secretary of each Medical Society in the United States is earnestly requested to send to the undersigned the following information:

Name of Society———. Place and time of meeting——. Officers, with address of each———.

WM. B. ATKINSON, Permanent Secretary.

SOCIETY NEWS.

Mississippi Valley Medical Association.—The Secretary of the Mississippi Valley Medical Association has issued the following:

INDIANAPOLIS, IND., Aug. 25, 1894.

Dear Doctor:—The Twentieth Annual Meeting of the Mississippi Valley Medical Association will occur in Hot Springs, Ark., Nov. 20, 21, 22 and 23, 1894.

The Association is now in a more prosperous condition than ever before, and no efforts will be spared to make the meeting at Hot Springs not only the largest but the most interesting and profitable ever held. Indeed, its success is already assured, many valuable papers by most excellent authors having been promised.

Hot Springs is an ideal place of meeting, and November in that charming Southern health resort is the most delightful month of the year.

Socially, the visit will be enjoyable in the extreme, as the physicians and citizens with their characteristic hospitality are united and enthusiastic in their endeavors to make the sojourn of their guests pleasant.

The railroad rates will be very low and will be announced later.

You are cordially invited to be present at this meeting.

Respectfully,
FREDERICK C. WOODBURN, Sec'y.

SELECTIONS.

A New Method for the Treatment of Tuberculosis Pulmonalis.—Following a preliminary communication upon this subject (*Cent. f. Bakter. u. Parasitenk.*, Bd. XIV, p. 719) Carasso, of Genoa, now gives full particulars of his method of treating tuberculosis pulmonalis (*Cent. f. Bakter. u. Parasitenk.*, Bd. XV, No. 25, and Bd. XVI, No. 1, 1894).

He first reviews the work that has been done with tuberculin, and demonstrates its unsatisfactory therapeutic application. The clinical results of the creasote, guaiacol, and benzo-guaiacol treatments are reviewed, and while the author admits their successful application in cases of beginning consumption, he regards them as unreliable, and powerless in advanced cases of the disease. The experiments with the toxines, blood serum, and thyroid implantation are dismissed with a few words.

The author refers to the numerous unsuccessful attempts at inhalation treatment. Among the agents employed in inhalation therapeutics, Carasso discards carbolic acid, creasote, and the various gases, on account of their irritant and uncontrollable actions; and finally directs attention to the ethereal oils, as the most desirable drugs for this method of treatment. The investigations of Chamberland, Champonnière, and Koch have proven that many of the essential oils possess decided germicidal properties. Koch, for instance, has shown that the essence of peppermint (menthæ piperita) prevents the development of the anthrax bacillus in dilutions of 10 parts to 300; and that the vapor of the oil was fatal to the bacilli and spores of anthrax.

In 1888 Braddon reported the results of his clinical application of peppermint inhalations, and Kersch gave his experience with inhalations of various ethereal oils. These reports induced Carasso to begin his experiments with these remedies.

The author believes that *mentha* exerts a direct bactericidal action upon the bacilli in the respiratory tract, and that, by absorption into the circulation, it acts as a general disinfectant. Creasote acts beneficially in pulmonary tuberculosis by increasing the appetite and favoring nutrition. It also possesses some action on the secondary inflammatory exudates, favoring their absorption.

Carasso's method of treatment is, in detail, as follows: A piece of linen cloth, ten centimeters square, is folded to make a pad, five centimeters by two centimeters. By means of tapes this pad is secured in contact with nostrils. The tapes may be tied around the head, about the ears, or to the frames of a pair of spectacles. The pad is to be worn day and night, and only to be removed at meal times. In the case of patients with out-door occupations, who object to wearing this inhaler for cosmetic reasons, a quill toothpick, or a cigarette-holder may be stuffed with cotton and, after saturation with the mint essence may be used as mouth inhalers. The inhaling pad is to be moistened with five or six drops of peppermint essence, four or five times a day. The nostrils are to be greased with vaselin for the first few days to prevent irritation. The patient is instructed to take eight or ten deep inspirations with closed mouth; retaining the air as long as possible. After ten or fifteen minutes' rest, this procedure is repeated, and so on through the day. In case difficulty is experienced in keeping the pads in position at night, the bed pillow may be impregnated with ten or fifteen drops of the mint essence.

The following mixture is given internally:

Creosote, pure (beechwood)	8.0
Alcohol	550.0
Glycerin	250.0
Chloroform	20.0
Essentiæ menthæ	8.0

A teaspoonful every three hours, in a half-glassful of water.

In certain cases the mixture may be further diluted with sweetened water, or the dose may be reduced. The nutrition is favored by the method of over-feeding. Two or three liters of sterilized or boiled milk are given daily; together with plenty of meat, cooked to taste; and with the addition of 400 or 500 grams of good wine.

All hygienic precautions are to be observed. The patients are instructed to carefully disinfect their expectoration, thus preventing reinfection.

The remarkable feature of Carasso's communication is the clinical report of the cases subjected to this treatment. In all cases the physical diagnosis was confirmed by finding the tubercle bacilli in the sputum. A careful weekly record was kept of each case, involving a complete physical examination. Many of the cases were well advanced in the disease, though no record is made of cases in which the lung destruction had advanced to the formation of cavities, recognizable by physical examination.

In all, forty-four cases are recorded. Of these there were six deaths, and thirty-eight *recoveries*. Of the fatal cases, five were subjected to autopsy, and four exhibited either general miliary tuberculosis, or intestinal and peritoneal tuberculosis, along with the lung disease. In one fatal case, the patient after once having the disease subdued, returned to her poor surroundings, and suffered a fatal relapse without again submitting to treatment. In another case of well advanced phthisis the patient died of capillary bronchitis soon after the beginning of the treatment.

From his record it appears that every case of primary pulmonary tuberculosis, treated by the inhalation method of Carasso's recovered; and that the fatal cases, with two exceptions, were ones in which secondary tubercular lesions produced death. The average duration of the treatment in these cases was *sixty days*.

The regularity of the improvement in these recorded cases is striking. The fever, cough and night-sweats rapidly diminished and ultimately disappeared. The bacilli in the sputum began to diminish in ten days, and all disappeared in sixty days; while the expectoration became first mucoid and finally ceased. The weakness, loss of appetite, and emaciation rapidly improved; the recovery in all the recorded cases seems to have been permanent.

The simplicity and harmlessness of this treatment of Carasso, together with the remarkably successful outcome of his cases, recommends the method for a thorough and systematic clinical test.—By A. P. Ohlmacher, 56 Fifth Avenue, Cleveland, Ohio.

The Glycero-Phosphates of Soda and Lime of Dr. Albert Robin; the so-called "Sequardine."—M. Robin has recently presented a paper before the *Académie de Médicine*, in which he makes claim to the discovery of the active principle of the noted Brown-Séquard liquids. This active principle is composed of phosphorus and glycerin, and is called the glycerophosphate, or the phosphoglycerate, of soda. It is also proposed to call the substance by a kind of memorial title, namely, "Séquardine," especially if there shall be a verification of the claims of M. Robin that he has made a veritable discovery. M. Robin has experimented with various combinations of the glycerophosphates of soda, lime and potash—now with one and now with the others—both by internal and by hypodermic dosage. He credits these medications with a powerful stimulative action over the nervous system, being in this respect the antipathic remedy to antipyrin. The latter stands as an agent against an excess of nervous excitation, whereas the glycerophosphates relieve nervous

depression. The following are some of the reported favorable results, and the supposed method of amending diseased nervous conditions:

"I inferred from my experiments that glycerophosphates could be advantageously used in cases where it is desired to restore nervous nutrition that is defective and to stimulate its activity.

"They have rendered good service during convalescence from grippe and other infectious complaints, in nervous asthenia of different origins, in a particular variety of neurasthenia, in some cases of torpid chlorosis in which nitrogenous oxidation was noticeably diminished, in phosphaturic albuminuria, and in one case of phosphaturia. They therefore seem to be indicated in all morbid conditions in which nervous reaction is unsatisfactory.

"I can mention, among others, the case of a man of 25 with Addison's disease. Thin, scarcely able to walk, cachectic, already weighing fifty-six kilograms, who from January 5 to 25 received a quarter of a gram per diem of glycerophosphate of lime in subcutaneous injections. On January 26 he weighed fifty-nine kilograms, and had recovered his strength.

"He left the hospital February 9 to resume work, but I saw him again April 5, as he came to let us know that the improvement in his case had persisted."

M. Robin reports further that some of the ataxic patients increase in weight at the rate of fifty grams a day. The treatment produces in them a tendency to moist skin, a feeling of warmth in the extremities, less apprehension in walking, and especially a very noticeable decrease in the fulgurant pains. The incoördination in walking is not changed to any degree.

Success was not invariable in the ataxic. In two cases no improvement occurred, while in a third there were signs of cerebral excitation after the fourth dose, with insomnia and slight hallucinations.

M. Robin has offered this as a preliminary report, with the following approximate results:

"These injections do not give rise to any local symptoms when made with the usual antiseptic precautions; they cause a burning feeling that rarely amounts to pain, and a more or less lasting redness of the skin.

"To resume the question: The glycerophosphates are powerful therapeutic agents which stimulate the general nutrition by means of their action on the nervous system.

"Their leading indication is nervous depression.

"In hypodermic injections their action is at least as energetic as Brown-Séquard's liquid, which in all probability owes its effects to the organic phosphorus it contains; it can therefore only be advantageous to use them in place of this liquid, since in this way we substitute a well defined substance that can be given in accurate amounts in the place of an uncertain preparation, that varies constantly and can not be preserved.

"The cases mentioned above allow us to hope that these injections will be of service in the treatment of nervous asthenia of different origins, of phosphaturic albuminuria, of Addison's disease, of some forms of sciatica and of tic douloureux of the face. In locomotor ataxia the results are more uncertain, and there seems to be nothing beyond an alleviation in the fulgurant pains."

NECROLOGY.

MEDICAL DIRECTOR PHILIP LANSDALE, U. S. N., on the retired list, died August 21, while on a visit in Connecticut. He was born in Maryland, in 1817, and entered the Navy in 1846, as Acting Assistant Surgeon. He was promoted Surgeon January, 1861; Medical Inspector 1871, and Medical Director June, 1873; retired with rank of Captain, in 1879, and since then has made his home in Philadelphia.——W. C. DABNEY, M.D., of Charlottesville, Va., August 20, after an illness of three weeks. He was born in Albemarle County, Va., July 4, 1849, and was educated at the University of Virginia. He was made the first President of the State Board of Medical Examiners, and held that office until September, 1886, when he was elected Professor of Obstetrics and Medicine in the University of Virginia. Many of the former pupils of Prof Dabney are in practice and join in sorrow at his death. He represented the Medical Society of Virginia in the National Medical Congress, held in Washington, D. C., in 1887; was a member of the AMERICAN MEDICAL ASSOCIATION, the Association of American Physicians, and honorary member of the West Virginia Medical Society. In 1873 Prof. Dabney was the prize essayist on medical chemistry of Harvard University.——J. W. CAMPBELL, M.D., of Ottumwa, Iowa, August 26.——M. O'Brien, M.D., at Topeka, Kan., August 28, aged 54. He was for a number of years a member of the State Board of Health, and four years its Secretary.

PUBLIC HEALTH.

Leprosy in Prussia.—A number of lepers have been discovered in several places in Eastern Prussia, especially at Konigsburg and at Memel, about seventy miles from Konigsburg. In this latter district alone ten genuine cases of leprosy have been found and the disease has been officially declared to exist in these districts.

A Medical Party in Politics.—The London *World* announces, with approval, the formation of a medical party in the English House of Commons, and says that it has been suggested that a Public Health Bills' Consolidation Act would be a good starting point for the efforts of such a party. The *Lancet* is not so sure about this proposal, but thinks that the influence of medical men will be greater in proportion as they avoid all appearance of party or partisan action; and adds: "Public health bills and bills restricting the sale of drugs are in the interest of the public, and the medical members should regard them as being outside all party questions. Otherwise we should be charged with interested views. We should be glad to see many more members of our profession in Parliament—but not to make a new party."

State Board of Health Bulletins.—The extreme to which "red tape" was carried in the office of the Third Assistant Postmaster-General, while dealing with the Tennessee State Board of Health in its efforts to have its Bulletin entered as second class matter is characterized by Dr. Lindsley, the Secretary, as falling "but little below the methods of a Persian satrap." The Secretary finally cut the tape by securing the following amendment to the Post Office appropriation bill:

"That from and after the passage of this Act, all periodical publications issued from known places of publication at stated intervals, . . . including the bulletins issued by State Boards of Health, shall be admitted to the mails as second class matter, and the postage thereon shall be the same as on other second class matter, and no more.

This means a reduction of some 95 per cent. in the postage accounts of the Board and should correspondingly increase the field of this useful class of publications.

Smallpox Prospects.—Dr. A. R. Reynolds, Health Commissioner of Chicago, has just completed an extended tour of inspection, covering the hospitals—especially those for contagious diseases—in the leading cities of the country, with a view to incorporating their best features in the new contagious-disease hospital for Chicago. As a result of his investigations the pavilion plan has been recommended, and it is announced that work will be begun at once upon its construction, for which the sum of $300,000 will be required; it is expected to complete enough of the structure to meet the requirements of the coming winter. Dr. Reynolds reports that there is a great deal of smallpox in the country and that physicians and sanitarians generally anticipate that the disease will again assume epidemic proportions throughout the country next winter. He is cited as saying that he does not expect that Chicago will wholly escape, but believes

that "inasmuch as vaccination has been so general there is no occasion for alarm. It is the history of the disease that it is worse the second winter than the first. Already the pest has broken out in certain sections of the city to an extent that is alarming. During the first few days of this month over 100 cases were reported."

Vaccination Technique.—One prolific source of confusion in attempts at tabulating the results of vaccination is the wide variety in the technique of the operation. The size of the area of the absorbent surface exposed, the method of exposure, the number of areas and other details which affect the evidence of the resulting scars, as well as the amount of protection afforded, lack so much in uniformity as to seriously impair the value of vaccinal statistics. This consideration lends additional importance to the observations of Dr. Ortega, who has noted in the epidemic of smallpox which occurred in Mexico in 1890, that a large number of railway employés who contracted the disease presented the very large and unsightly cicatrices of vaccination by *grattage* (scraping). Among those vaccinated by *piqûre* (sticking) a very small number only contracted the disease, and in these it was mild, while in those vaccinated by grattage it was, in general, severe. The re-vaccination by piqûre in those previously vaccinated by grattage was almost always successful, while this was the exception in those vaccinated by piqûre. The patients vaccinated by grattage almost always suffer from inflammations in the vaccinated member of greater intensity and of longer duration than subjects vaccinated by piqûre. Finally, vaccination by the former method frequently produces cicatricial keloids. The pustules developed by grattage are probably septic, not vaccine pustules, because the larger surface allows the absorption of septic elements, while by the piqûre, although repeated several times, vaccine lymph only is introduced.

Diphtheria Diagnosis, Treatment and Prophylaxis.—The medical sensation of the day, at least in the daily press, is the antitoxin treatment and prophylaxis of diphtheria; columns are devoted to fairly accurate descriptions of antitoxin, its methods of preparation, and its modes of use in treatment and for immunizing purposes; and the reader is told that "not since Jenner's discovery of vaccination has there been a more important step in advance than the treatment for diphtheria put forth from Dr. Koch's famous laboratory in Berlin." All of which may or may not be so—time alone can tell; and all of which may or may not be profitable literature for the lay reader. Certain it is, however, that the reports, which we find in our foreign exchanges, of the results of the antitoxin treatment thus far fully warrant the claims made for it—*qua* treatment. Obviously, sufficient time has not yet elapsed to determine the extent and duration of the immunity conferred by this agent. But its use for the protection of inmates of infected dwellings and for the protection of the inhabitants of localities or districts in which diphtheria is prevalent, is confidently recommended by Dr. Aronson, who furnishes instructions for its use for such purposes with the supplies made under his supervision.

An appropriation of $30,000 is asked for by the New York City Board of Health, with which to defray the expense of producing antitoxin—mainly for gratuitous use among the city poor, who furnish the largest number of victims of the disease. Our English cousins look with favor upon the New York method of diagnosing diphtheria by bacteriologic examination. (It seems proper to call this the "New York method," since it was the Health Department of that city which first made such examination feasible and practical; although its general adoption throughout the country might now entitle it to be called the American method.) In his annual report for 1893, Dr. Francis Allen, Medical Officer of Health for the Strand district of London, advocates the adoption of this method of prompt diagnosis and appeals to the Metropolitan Asylum Board to make arrangements for the supply of culture tubes and the carrying out of the necessary cultivations, etc.

The Cholera.—The situation in Europe *re* Asiatic cholera, has not materially changed from that summarized in last week's issue of the JOURNAL. Up to the close of August the weather had been generally so cool on the continent as to retard any serious extension of the disease beyond the localities then reported infected. Our English exchanges confirm the gravity and extent of the outbreak in Galicia and Bukovina. The most prolific center of the pestilence is the town of Zaleszczyki, which has become a very hotbed of cholera. Nothing like it has, at all events, been known in Austria for the last two years. In the brief space of about two months no less than 5 per cent. of the entire population in the town have been attacked by the disease. Seventeen districts in Eastern Galicia are declared infected; they form one united area, subject to the same sanitary regulations. These districts lie in the basins of Dniester and Pruth. The same spot formed the cholera center of last year. This and similar recurrences have revived speculation as to the probability of the cholera germ having become domesticated in Europe. It is recalled that in 1892 the epidemic of Nanterre, a suburb of Paris, could not be traced to any outside infection, but in the asylum at that place there had been previously some cases of Asiatic cholera; from here the disease apparently spread to Havre, then to Hamburg, and then to this country. In 1884 all the drinking-water wells in Naples were closed because a company had laid water conduits; in 1893, in the lowest part of the city, some of these wells were re-opened without the consent of the municipality, and cholera appeared in just that portion of the city; Naples had very little if any commerce with India, and it is now thought highly improbable that these cases were due to outside infection.

The German authorities are displaying the greatest activity in efforts to prevent the disease obtaining a foothold, and since his return from England Emperor William has ordered that full reports be furnished him with reference to the measures taken to prevent the spread of cholera. Dr. Koch has had an audience of several hours with the Emperor, who entered into the details of the precautions necessary and displayed great concern at the possibility of a recurrence of the pest on any great scale in Germany. It was upon the report of Dr. von Gossler, President-in-Chief of the Province of West Prussia, as to the extent of the disease in and around that district, that the abandonment of the military maneuvers in Western Germany this year was decided, and it is said that hardly a day passes that the Emperor does not confer with some expert or administrative officer engaged in combating the disease.

There has been one more death among the cholera cases at Battersea, on the Surrey side of the Thames, but the other patients are convalescing and the alarm has subsided. Rigid precautionary measures are, nevertheless, enforced; masters and officers of vessels are required to report every case of diarrhea occurring on board while within the limits of the port of London, and physicians of Edinburgh and some other seaport towns are required for the next two months to report their cases of British cholera and choleraic diarrhea in addition to the diseases previously required to be notified.

Blank Applications for membership in the ASSOCIATION at the JOURNAL office.

MISCELLANY.

Monument to Claude Bernard.—A statue of Claude Bernard will be unveiled with appropriate ceremonies at Lyon, France, October 26, next. The French Congress of Internal Medicine will hold its annual session at Lyon on the same date.

Painful Accident.—We regret to learn that our colleague Dr. John V. Shoemaker, editor of the Philadelphia *Medical Bulletin*, sustained a painful injury in London, which incapacitated him from attendance on the annual session of the British Medical Association lately held in Bristol.

New Hospitals.—The Rockford, Ill., City Hospital was endowed August 28, by William A. Talcott, S. Barton Talcott, Fannie E. Prentice, and Mary C. Pettibone, of Chicago, for $5,000, the gift being for two free beds, in memory of their parents, Mr. and Mrs. Wait Talcott.

The corner stone of the Julia F. Burnham Hospital was laid at Champaign, Ill., August 23, with Masonic ceremonies.

Catgut Drainage Tube.—M. Desguin, of Antwerp, presented at the last meeting of the Society of Surgery of Belgium, drainage tubes obtained by interlacing of long large threads of catgut, forming tubes of different dimensions. He was able to obtain sterilization by heat or chemicals without altering. They are less rigid than decalcified bone tubes; absorbable and porous, and constitute ideal drainage tubes.—*Gazette Medicale de Paris*, Aug. 18, 1894.

Survival of the Fittest.—Russian courts have reversed the assumption of American tribunals that when a husband and wife are drowned in the same disaster, the wife dies first. The Russian doctors have testified unanimously that the man would be the first to die, because the woman is more agile and keeps herself longer above water. Another fact to support the argument of the Darwinian doctrine!

Poison in the Chalice.—Controversy over the individual communion cup still rages. A correspondent of the New York *Sun* suggests that if religious sentiment or belief requires that, "in order to carry out our Lord's order, separate chalices should not be used, it seems to me that the scientific objection to the single chalice might be removed by providing each communicant with a glass tube through which to partake." And adds that "any one objecting to this method on the ground of worldly association could hardly possess a mind pure enough to entitle him to the privilege of the holy ceremony."

The Late Congress at Rome.—The *Lancet* for August 4 points out the fact that an unusually artistic set of photographs has been prepared by a Roman artist, Cardilli, not only of the nineteen Sections of the Congress, but of the principal speakers in the open conferences. The *Lancet* specifies the portraiture of Virchow, of Koch, of Pasteur, of Lombroso and of President Bacelli himself as being very successful in depicting the features and characteristic expression of those leaders of modern medicine. Dr. Bacelli has been presented with a "first copy" of the album, or collection of photographs, and has expressed his approbation thereof and his hope that the fine work shall have as wide a diffusion as possible. The name of the artist is Giovanni Cardilli. The cost of the album to intending purchasers is not mentioned in the *Lancet* article.

A Septuagenarian's Holiday.—The *Lancet* invites attention to what Prof. Virchow, Rector Magnificur of the University of Berlin, has pledged himself to perform during his summer holiday at the age of 73. First, he will repair to Stockholm to take part in the "Americanisten-Congress;" next, he will appear at Innsbrück as the most conspicuous figure at the Congress of Anthropologists; thirdly, he will assist, *primus inter pares*, at the "Naturforscher-Congress" in Vienna; fourthly, his presence will be one of the chief attractions at the Hygienic Congress to be held at Buda-Pesth; and finally he will close his scientific itinerary by entering an appearance at the Bosnian Archæological Congress, which is to meet at Serajewo. And not only will he leave those assemblies the richer for his participation; but he himself will profit by the experience, ascribing as he does to such periodical encounters with younger minds the re-invigorating effects which explain his phenomenal vitality.

Correcting History.—Dr. Edward Worthington, a delightfully garrulous "old-timer," furnishes *The Medical Age* his "Reminiscences of Early Practice," full of sound sense, kindly humor and "paukie" Scotch wit. Telling of the days when "a medical man would as soon have dreamed of going to church without his prayer-book, or of going to bed without saying his prayers, as of going out on his daily round of duty without his lancet-case in pocket," he recalls the fact that the "fat friend" of Beau Brummel's sarcasm, the profligate and licentious George IV., lost first eighty ounces and, within twenty-four hours, another fifty ounces of blood on account of a cold. Dr. Worthington prefaces the account thus: "When George, the great Father of the American Republic, lay dying, at midnight, Jan. 29, 1820—I do not mean George Washington, but the other George, the Third George,—his most affectionate son the Prince Regent, 'the First Gentleman in Europe,' was unable to attend at his father's death-bed." Thus has it remained for a medical man, with his professional penetration in determining first causes, to vindicate the truth of history and ascribe the paternity of this Republic to its proper source.

In Borrowed Plumes.—Commenting editorially upon the scurrile jests upon doctors indulged in by *Life*—a comic weekly paper—the New York *Medical Record* takes occasion to show up the professional humorist as a very cheap sort of a plagiarist. *Life's* definition of a doctor—"a person who, when you are ill, comes and guesses what is the matter with you"—is shown to be an adaptation of, but not an improvement upon the original given by Voltaire in 1740, to-wit: "A doctor is a person who pours drugs, of which he knows little, into a body, of which he knows less." Our scholarly contemporary cites other illustrations to show that the material for similar definitions of doctors exists in literature from ancient to modern times; that the sum and substance of the medical jokes of the past two thousand years, or at least samples of them, are all in print and form a part of accessible literature. "We could refer the amiable malefactor who writes his weekly medical jokes in this New York paper to the volumes in which all the above facetiæ are compiled, but he shows that he possesses them." After which neat hit the *Record* asks *Life* why—if it can not give the world some new medical jest nor give proper credit for its borrowed ones—it can not sometimes be pleasant and show the other side. "Even Voltaire, who was a bigger man after all than the average New York jest-maker, said: 'Nothing is more estimable than a physician who, having studied nature from his youth, knows the properties of the human body, the diseases which assail it, the remedies which will benefit it, exercises his art with caution, and pays equal attention to the rich and the poor.'" It strikes the JOURNAL that, big as the philosopher of Ferney may have been, the comparison of the professional libellist and lampooner who made a scoff of religion—"*Deo erexit Voltaire*"—and prostituted his talents through sheer wantonness, with the "average New York jest-maker" who distorts the truth for the sake of a facile sneer at vivisection and "conveys" his slanders of the medical profession from the "Joe Millers" of the past, is particularly felicitous.

Epileptic Colony in Sweden.—More than twenty years ago a Swedish lady, Madame De Ramsay, began a small Home for cripples and Epileptics, at Wilhelmsro. The support given by benevolent citizens has been sufficient to maintain the institution according to the plans of its founder, down to the present time, but advancing years and other causes have compelled the lady founder to look forward to soon laying aside this work, and she is anxious to secure an endowment for the colony before she passes the management over to other hands. In a recent report, she has sketched her relations to the cause of the epileptics and others. A portion of this report is given below:

"Several members of our royal family became interested in the progress of the work, and at length Parliament resolved to give grants for the keeping of epileptic children in suitable homes, and institutions sprang up as seedlings from the plantation at Wilhelmsro.

"This summer a greater joy has been afforded me. A committee has been formed in Gothenburg of friends who, recognizing the necessity of such homes, and appreciating the excellent arrangements and the self-sacrificing management of the Wilhelmsro homes, wished to show their respect in this matter by purchasing 'The Hope,' the largest of the homes, fitted up for thirty children. The committee, moreover, is henceforth answerable for the funds. During the past winter, when lying at the point of death, it was my constant cry, 'O Lord, let not these unhappy children be scattered in a world that does not care for them.' The prayer was heard, life was prolonged, and true friends came forward, which greatly hastened the recovery.

"But for that timely relief it would not have been possible to open a very much needed new home at Wilhelmsro, 'The Refuge,' for the worst cases among epileptic children, those who, in addition to their great affliction of epilepsy, are deaf, dumb, idiotic, paralytic, and sometimes blind! The sufferings of these unhappy beings are greater than can be described, and I have longed for years to provide for them a 'refuge.' It will be a great satisfaction to spend the last years of a long life in providing for these unfortunates, and I hope that in due course the same committee will also be responsible for 'The Refuge.' But the future is left to God; the present object is to work for the neglected beings, and, in the cases of cripples and epileptics, to press upon the public the duty of making humane provision for their needs."

Washington Notes.

Garbage Removal.—During the stay of the Pythian Encampment, garbage will be removed daily in order to better protect the health of the city.

Physician to District Jail.—Dr. D. K. Shute, Professor of Anatomy in the Columbian Medical College, has been appointed Visiting Physician to the District jail.

Health Office Appointment.—Dr. Austin O'Malley has been appointed by the Commissioners, Chief Medical Sanitary Inspector in the Health Department *vice* Dr. Osman, deceased.

Contaminated Pump.—The Health Officer has forwarded to the Commissioners two reports of Dr. Walter Reed, of the Army Medical Museum, giving the results of bacteriologic examination of water from the well, corner of Sixth and O Streets northwest. Both reports show conclusively that the water is contaminated by fecal bacteria.

Anatomical Bill.—Congress has not as yet agreed to the bill for the promotion of anatomical science and to prevent the desecration of graves, which provides that bodies of paupers may be given to medical colleges under certain stipulations. This is practically the same bill that was vetoed by President Cleveland during his first administration.

Congressional Library.—The annual report of Librarian Spofford, which has been presented to Congress, shows that the library contains 695,880 volumes and 223,000 pamphlets; 18,594 volumes were added during the present year, and 58,956 copyright entries were made. Of these 18,498 were books, 16,273 musical compositions, 11,094 periodicals, 4,920 photographs, 1,810 chromos, 1,814 maps, 918 lithographs, while the balance consisted of paintings, maps, chromos, etc.

Portable Disinfecting Chambers.—The Marine-Hospital Service has completed two portable disinfecting chambers at Philadelphia, Pa., which are to be used when necessary for municipal disinfecting. The apparatus consists of one large chamber for steam and one for sulphur fumigation. They may be brought to Washington, for use in the Health Department if necessity require.

An Abortionist in Close Quarters.—Dr. Edward Leon, an "irrigator," who was last fall convicted of having produced an abortion which resulted in the death of the child, was first found guilty of murder in the first degree and allowed a new trial, resulting in a verdict of manslaughter, desires a stay of sentence and a third trial. He is innocent, so *he* says, and claims to be able to prove that the crime was committed by another doctor.

Death of Dr. Osmun.—Dr. Charles J. Osmun who for several years was Chief Medical Sanitary Inspector in the District Health Office, for infectious diseases, died on the 14th instant after a three days illness with malignant diphtheria. This is a particularly sad death, the disease being contracted during the faithful discharge of duty. Dr. Osmun was unmarried. The Medical Society and Health Department held special meetings and adopted appropriate resolutions of respect.

Assistant Coroner for the District.—The act creating the office of Assistant Coroner for the District has become a law. This will prevent, after he is appointed, a repetition of the embarrassment arising during the "Ford's Theater" inquest when it was announced that only the Coroner could conduct the investigation. The inquest was about completed by the Coroner's substitute when this fact was brought out by the attorneys, and the proceedings began anew by the late Coroner, Dr. De Witt C. Patterson then confined to bed by illness, but who notwithstanding, reported for duty and conducted the case, greatly to the detriment of his health.

The President has signed the bills to prohibit the interment of bodies in Graceland Cemetery and to provide for the sale of the property of that cemetery and the removal of the bodies already interred there. This cemetery has been outgrown by the surrounding neighboring community and almost surrounded by dwellings. It has been deemed a matter of only common precaution to remove the possibility of infection from the presence of these bodies in the midst of a thickly populated community, and this enactment is in the line with all similar legislation in other cities to remove burial grounds beyond municipal limits, and provide for the sale of new tickets by the street railway and herdic companies of the District. The nuisance of old, tattered and germ-laden tickets has been borne more or less patiently by the patrons of the local companies for many years, and this bill granted great relief by compelling the companies to issue their tickets in sheets of six for 25 cents and to cancel each ticket presented for fare so that it could not be used again. An appropriate penalty was provided to punish proved violations of the law. Since the expiration of the thirty days' margin granted to the companies after the passage of the act there has been inaugurated an era of clean, crisp and wholesome trip slips such as has never before been seen in Washington.

Philadelphia Notes.

The health of the city during the heated term has been remarkably good. With the exception of a limited outbreak of diphtheria in one of the suburbs, there has been nothing that approached an epidemic, although some instances of the contagious zymotic diseases have occurred and a few cases have been received into the municipal hospital; ty-

phoid fever cases also are reported occasionally. It is evident that the efforts put forth by the Board of Health and private citizens, under the stimulus of the cholera scare for the last two years, have resulted in a greatly improved sanitary condition of the city. The back streets and alleys have been kept clean, public bath houses have been well patronized, the food-supply is watched and, in particular, dishonest dealers in milk have been frequently detected and punished, so that there is a distinct improvement in the quality of this staple food article. In this connection might be mentioned an agency that has not been without its favorable influence upon the lives of the children. A little more than two months ago Rabbi J. Leonard Levy, of this city, founded the Philadelphia Sterilized Milk and Ice Society for the purpose of supplying these necessaries to the poor at cost, during the summer. Mayor Stuart consented to act as President, with Rabbi Levy as First Vice-President, and the City Treasurer, Mr. McCreary, as Second Vice-President. This charitable work appealed to the benevolent and like the similar organization in New York City, it was at once successful. Since it began operations, it has sold over 7,300 bottles of sterilized milk, several tons of ice, beside fresh milk and infants' food. Disinfectants have also been distributed with directions as to their use. In one week, 13,509 persons were helped by this organization. The receipts have averaged about 3 cents for each purchase. The Society has now five stores or depots in different parts of the city and employs about a score of persons. It is difficult to fully estimate the practical good which such a work may exert upon the health and mortality of the crowded portions of the city. It is strictly in line with the college settlements and guild houses, which have been doing a civilizing and humanizing work in the congested precincts for several years, and with encouraging results.

Another agency, which should not be overlooked, on account of its effects upon the children particularly, is the Sanitarium Association for Children, which has its plant situated on the New Jersey side of the Delaware River about twelve miles below Philadelphia. This noble charity keeps two large steamboats running between the city and the large grounds; where the children are brought by their care-takers to spend the day under the trees, where hammocks, swings, etc., are provided. There is also a small well appointed hospital for children, who require attention or are too ill to return to the city, and who can here receive proper medical care from the resident physicians and nurses. The entire service is free, including a luncheon both for children and care-takers. Up to the evening of August 16, 139,959 persons, (including adults with children) had been admitted in 69 days, an average of 2,332 per day. It is not unusual, on a hot day, to have more than double this number to enjoy the hospitality of the Association. A new bath house for infants and small children has just been put into use and is well patronized.

The Children's Country Week Association, which has sent several hundred children out of the city during the hot weather, has undoubtedly contributed to the improved health of the city. The city streets are now cleaner than ever before, owing to the fact that the railway companies have introduced the trolley system very generally; thus doing away with hundreds of horses, and also by city ordinance they were obliged to re-pave the streets with asphalt or some other improved pavement, so that the cobble-stone pavement has disappeared from all the principal streets.

The water supply of the city will soon be increased by the completion of the new Queen Lane reservoir, consisting of two basins, brick and concrete lined, with a storage capacity of 386,000,000 gallons of water. A system of sand filtration is under consideration and probably next year will be introduced, which it is hoped will have the same effect here as in the cities of Europe, and greatly reduce cases of typhoid fever and bowel disorder

The diminished mortality from sunstroke of late years is attributable in part to the popular appreciation of the danger of alcoholic drinks and the greater care in their use during hot weather, and in part to the fact that patients affected upon the street are rapidly taken in the city ambulances to the hospitals, in nearly all of which cases of insolation are treated in tents (or in the open air) and promptly cooled down with ice or cold bathing.

Among the numerous agencies tending to reduce the mortality of the city may also be mentioned the action of the City Board of Health in circulating leaflets on "The Care of Infants in Hot Weather," and "The Prevention of Tuberculosis." This has doubtless led to a reduction in the number of cases of summer complaint and consumption.

Medical College Notes.

DR. GEO. M. PHILLIPS, of Maysville, Kentucky, has been called to fill the Chair of Genito-Urinary Surgery in Barnes Medical College, St. Louis. Dr. Phillips is a graduate of the College of Physicians and Surgeons, of Baltimore, and goes to his new field of labor after an abundant clinical experience and with the best of home and foreign recommendations.

New Orleans.

DR. J. D. BLOOM, formerly Assistant House Surgeon, upon the death of Dr. Albert B. Miles, was promoted to the House Surgeonship of Charity Hospital. Two Assistant House Surgeons were appointed on equal footing, Drs. W. E. Parker and H. Mark Fortier. All of these gentlemen are graduates of the Medical Department Tulane University of Louisiana, and reflect great credit on the younger members of the New Orleans profession.

THE PUBLIC SERVICES.

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from August 18, 1894, to August 24, 1894.

Capt. ALFRED E. BRADLEY, Asst. Surgeon U. S. A., is granted leave of absence for one month, with permission to apply for an extension of one month.

Capt. JOHN L. PHILLIPS, Asst. Surgeon, is granted leave of absence for two months, to take effect on or about Sept. 1, 1894.

First Lieut. MADISON M. Brewer, Asst. Surgeon, is granted leave of absence for three months, to take effect on or about Oct. 1, 1894.

Capt. WILLIAM H. CORBUSIER, Asst. Surgeon, is granted leave of absence for one month, to take effect on being relieved from duty at Ft. Supply, O. T.

First Lieut. WILLIAM H. WILSON, Asst. Surgeon, will be relieved from temporary duty in the Department of Dakota by the commanding General of that Department, when his services are no longer required with troops in the field, and will return to his proper station

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending August 25, 1894.

P. A. Surgeon I. W. KITE, ordered to hold himself in readiness for orders to the U. S. S. "Constellation."

P. A. Surgeon T. B. BAILEY, ordered to hold himself in readiness for orders to the U. S. S. "Machias."

LETTERS RECEIVED

(A) Atkinson, W. B., Philadelphia, Pa.; Anthony, A. G., Oakland, Cal.; Antikamnia Chemical Co., St. Louis, Mo.

(B) Barnum, F. E., Utica, N. Y.; Brainerd, H. G., Los Angeles, Cal.; Buxton, G. E., National City, Cal.; Bassett, M. F., San Jose, Cal.; Brown, M. R., Chicago, Ill.

(C) Cone, A., New York City; Crothers, T. D., Hartford, Conn.; Carpenter, J. T., Pottsville, Pa.

(D) Dunglison, R. J., Philadelphia, Pa.; DeCourcy, J. O., St. Libory, Ill.; Donges, J. W., Camden, N. J.

(E) Eaton, F. B., Portland, Ore.; Ellis, Griffith, Dayton, Ohio.

(F) Foster, A. B., Fonda, N. Y.

(G) Griffiths, L. M., Bristol, Eng.

(H) Hummel, A. L., Philadelphia, Pa.; Howell, S. M., Duncan Falls, Ohio; Hunt, A. Clark, Trenton, N. J.; Hill, E. S., E. Killingly, Conn.

(I) Ingals, E. F., Chicago, Ill. (2).

(J) Johnson, H. L. E., Washington, D.C. (2); Jones, Hamilton P., New Orleans, La.; Jenkins, J. C., Everetts, N. C.

(K) Kephart, A., Petoskey, Mich.; King, Geo. D., New York City; King, John E., Thistletown, Ont.; Kindred, J. Jos., Darien, Conn.; Kolb, M. G., Cleveland, Ohio.

(L) Lamb, L. K., Aurora, Ind.; Lehn & Fink, New York City.

(M) Murphy, R. W., San Francisco, Cal.; Millard, P. H., St. Paul, Minn.

(N) Neff, I. H., Kalamazoo, Mich.

(R) Rathmell, J. R., Chattanooga, Tenn.; Rozzell, M.W., Pryorsburg, Ky.; Rook, C.W., Quincy, Ill.; Reinking, H., Sheboygan, Wis.; Reynolds, D. H., Louisville, Ky.; Rausohoff, Joseph, Cincinnati, Ohio.

(S) Schaefer, H. J., Philadelphia, Pa.; Small, A. R., Chicago, Ill.; Simmons, Geo. H., Lincoln, Neb.; Stearns, F. & Co., Fonda, N. Y.; Stillians, D. C., Chicago, Ill.; Stover, C., Amsterdam, N. Y.; Solly, S. E., Colorado Springs, Colo.

(T) Taylor, Lewis H., Wilkes-Barre, Pa.; Troy Buggy Works Co., Troy, Ohio.

(W) Will, O. B., Peoria, Ill.; Woodbridge, J. E., Youngstown, Ohio; Wyeth, J. A., New York City; Wilbur, C. T., Kalamazoo, Mich.; Woods, G. W., Mare Island, Cal.